JAIKRISHNADAS AYURVEDA SERIES
No. 160

A Text Book of
SVASTHAVṚTTA

(According to C.C.I.M. Syllabus, New Delhi)

by
Dr. Mangalagowri V. Rao
M.D. (Ayu.)

CHAUKHAMBHA ORIENTALIA
A House of Oriental and Antiquarian Books
VARANASI

Dedicated to my beloved Parents

Late Smt. Sudha. V. Rao

and

Sri. G. S. Venkatesha Rao

FOREWORD

The concept of Svastha and the achievement and maintenance of Svāsthya is a subject that fascinated mankind through out the course of human evolution. We find elaborate description in all the classical texts of Āyurveda on Svasthavṛtta. Infact Āyurveda stresses mainly on preventive rather than curative aspects of diseases.

Dr. Mangalagowri, in her work **"A Text Book of Svasthavṛtta"** creates a milestone in the study of svasthavṛtta. She discusses both ancient as well as modern concepts of Svasthavṛtta with consummate ease. Any one who is cognizant of the divergent views that exists between the traditional and modern knows how difficult it is to work out a semblance of unified thought and approach in the maintenance of physical and mental health. One such field of divergence is Brahmacarya. Among the social tenets of Brahmacarya, one is sexual continence. Āyurveda ascribes great importance to Śukra in the maintenance of health and longevity. While modern science considers it just as a glandular secretion of no importance other than reproduction. These are twilight zones in the understanding of human physiology. Years of study and interaction with patients tells me that the concept of Brahmacarya and Sadvṛtta as described in our classical texts forms the quintessence of preventive health care.

Dr. Mangalagowri was among the best of students I can remember. What differentiates her from the mediocre is her analytical skill and pursuit of academic excellence. I am confident that her contribution will be a valuable one for students, scholars and general public.

Place : Bangalore
Date : 21st June, 2007

Dr. M. Ramesh

Professor & Head of the Department
Department of Prasuti & Streeroga
Govt. Ayurvedic Medical College,
Bangalor- 560 009

PREFACE

The idea of writing a book seeded, when I started teaching the subject Svasthavṛtta and Yoga, especially when I had to sit with piles of different books to search for various points in the syllabus. I felt it would be benficial if all essential aspects of Āyurveda, Yoga, nature-cure and modern preventive and social medicine are included in a single book. The idea was nourished by my family members and friends resulting in a fruit in the form of present book. The subject is arranged in a format, which I thought would be appealing for the students studying the preventive medicine in Ayurveda.

Arrangement of chapters is according to the current CCIM syllabus stipulated for BAMS course. Hopefully, students of MD(Ay) in Svasthavṛtta and Yoga too will be benefited by this book.

Apart from Bṛhattrayis and Laghutrayīs, other ancient works like Muhūrta Martānda and Manusmrti have also been consulted for collecting the relevant references. Commentaries of Cakrapāṇi and Dalhaṇa have been given wherever found necessary.

The major aim of this book has been to analyze Āyurvedic and modern aspects in a comparative manner. For example, various food articles desccribed in Āyurveda are explained along with their botanical names, properties and nutritive values, which may be used as a ready- reckoner while designing the diet based on Āyurvedic principles. Communicable diseases have been concisely dealt with in the form of tables along with Āyurvedic correlations. Chapters on Yoga include references from Patañjali's Yoga Sūtra, Haṭhayoga Pradīpika and Gheraṇḍa Samhita. Along with the description of practical methods of Yogic practices, associated physiological changes and indications have also been narrated. Principles of naturopathy, different modes of treatments, indications, methods of application and nature-cure diet are dealt with in detail. Aspects of primary health care, national programmes, health administration, and role of Āyurveda in present day healthcare system are explained briefly with the help of flow charts.

I am thankful to the authors of all books quoted as references in this book. I thank Prof. M. Ramesh, Head, Department of Prasuti Tantra and Stree roga, Government Ayurvedic Medical College, Bangalore, for having written the foreword to this book. He has been a great inspiration for me throughout. I am also thankful to Prof. Manjari Dvivedi, Dean Faculty of Ayurveda, IMS, BHU, for her constant encouragement. I am grateful to Prof. Ahalya Sharma, Prof. Shreedhar, Prof. K. Shankaran, Prof. K. Jyotilal, Dr. Mariamma Jacob and Dr. H. H. Awasthi whose guidance has always been valuable for me.

I cordially thank my colleagues and students at BHU and A.L.N. Rao Memorial Ayurvedic College, Koppa. Thanks to Dr. Sarvesh, Dr. Vijay and Dr. Trupti for helping in proofreading.

I am also thankful to my father Sri. G.S. Venkatesh Rao, grand mother Smt. Savitribai Pandeshwar and my son Mihir Dutta, without whose love and support this would have been an impossible task. Thanks to my sisters Shobha and Lakshmi, brother in-laws Prabhakar and Ramesh and their kids Anirudh, Pratiksha and Pritha for their constant support. I also thank my well-wishers Dr. Jagadeesh, Dr. Deepti, Dr. Kishor Patwardhan, Dr. Medha and Dr. P.S. Byadagi for their support and encouragement. I am grateful to Mr. Atul Gupta of Chaukhambha Orientalia, Varansi, for publishing this book.

Any errors in the book have to be forgiven by the readers. Your opinions and criticism are valuable.

Date : 07-07-07
Varanasi

Dr. Mangalagowri V. Rao

CONTENTS

PAPER- I
PART-A
Personal Hygiene

PART- B
Public and Social Hygiene

PAPER- II
PART- A
Yoga and Naturopathy

ABBREVIATIONS

च. सू.	-	चरक संहिता सूत्र स्थान
च. नि.	-	चरक संहिता निदान स्थान
च. वि.	-	चरक संहिता विमान स्थान
च. शा.	-	चरक संहिता शारीर स्थान
च. चि.	-	चरक संहिता चिकित्सा स्थान
च. सि.	-	चरक संहिता सिद्धि स्थान
च. पा.	-	चक्रपाणि टीका
सु. सू.	-	सुश्रुत संहिता सूत्र स्थान
सु. शा.	-	सुश्रुत संहिता शारीर स्थान
सु. नि.	-	सुश्रुत संहिता निदान स्थान
सु. चि.	-	सुश्रुत संहिता चिकित्सा स्थान
सु. क.	-	सुश्रुत संहिता कल्प स्थान
सु. उ.	-	सुश्रुत उत्तर तन्त्र
ड	-	डल्हण टीका
अ. सं.	-	अष्टाङ्गसंग्रह
अ. हृ.	-	अष्टाङ्ग हृदय
आ. र.	-	आयुर्वेद रसायन
स. सुं.	-	सर्वाङ्ग सुन्दरा
का. सं. खि.	-	काश्यप संहिता खिल स्थान
भा. प्र. पू.	-	भाव प्रकाश पूर्व खण्ड
भा. प्र. उ.	-	भाव प्रकाश उत्तर खण्ड
शा. सं.	-	शार्ङ्गधर संहिता
म. म.	-	मयमते
मु. मा.	-	मुहूर्त मार्ताण्ड
क. का.	-	कल्याण कारक
श. क द्रु.	-	शब्द कल्प द्रुम
ज. क. त.	-	जल्पकल्पतरु
प. अप. वि.	-	पथ्यापथ्य विभोदक
भ. गी.	-	भगवद्गीता
क्षे. कु.	-	क्षेम कुतूहल
गृ. भू.	-	गृह भूषण
ह. यो. प्र.	-	हठ योग प्रदीपिका
प. यो. सू.	-	पतञ्जल योग सूत्र
घे. सं.	-	घेरण्ड संहिता

Part- I

(First Paper)

PERSONAL HEALTH

INTRODUCTION

A long healthy life is wish of every being since antiquity. *Āyurveda* is the science of life with the aim of attaining health and curing diseases of ill.

धर्मार्थकाममोक्षाणां आरोग्यं मूलमुत्तमम्। रोगस्तस्यापहर्तारः श्रेयसो जीवितस्य च।।(च.सू.१/१५)

Main aim of *Āyurveda* is to attain pious acts *(Dharma)*, wealth *(Artha)*, desire *(Kāma)* and Salvation *(Mokṣa)* by health. Ill health takes away the health and happiness from life.

प्रयोजनं चास्य स्वस्थस्य स्वास्थ्य रक्षणं आतुरस्य विकार प्रशमनं च ।। (च.सू.३०/२६)

Caraka emphasises on the importance of maintenance of health of healthy person and curing the disease of the ill.

Even while mentioning classification of drugs, *caraka* considers the drugs which help in the maintenance of health.

किञ्चिद्दोषप्रशमनंकिंचद्धातु प्रदूषणम्। स्वस्थवृत्तौ मतं किंचित्रिविधं द्रव्यमुच्यते।।(च.सं.सू१/६७)

Drugs can be classified into those which pacify *doṣās*, which vitiate *doṣas* and maintain the health.

सुष्ठु अवन्तिष्ठते निरोगत्वेन इति स्वस्थः । तस्य वृत्तिः स्वस्थरूपतया अनुवर्तनं तत्र स्वस्थ वृत्तौ मतं ।। (च.सू.१/६७) (च.पा.)

Again *cakrapāṇi* commenting on *svasthavṛtta*, mentions the condition free from the disease is *'Svastha,* ie healthy and the regimens followed to keep one self healthy is *svasthavṛtta*.

Else where again the **definition svasthavṛtta** has been mentioned.

स्वस्मिन् स्थाने स्वस्मिन् कर्मणि स्वसु रूपे स्थीयते तत् वृत्तं स्वस्थवृत्तं ।।

The condition where all *doṣās, dhāthus and malās*, are in their normal site, form, performing normal functions is *'Svastha'*, *'Vṛtta'* means *Ācāra, carita, or bhāva* or regimens to be followed to attain health.

Importance of Svasthavṛtta

न जन्तुः कश्चिदमरः पृथिव्यां जायते क्वचित् । अतो मृत्युरनिवार्यः स्यात्किन्तु रोगान्निवारयेत् ।(शा.सं.)

Śārṅgadhara quotes no creature in the universe is immortal, it is impossible to prevent death, but it is possible to prevent disease. So one should try for that which is preventable.

नगरी नगरस्येव रथस्येव रथीयथा। स्वशरीरस्य मेधावी कृत्येष्ववहितो भवेत्।।(च.सू.५/१०३)

A wise person should perform such actions which are good for his body as the officer incharge of the city and chariotere incharge of the chariot protect city and the chariot respectively.

सर्वमन्यं परित्यज्य शरीरमनुपालयेत्। तदभावे हि भावानां सर्वाभावः शरीरिणाम्।। (च.नि.६/७)

Caraka further emphasises on maintenance of health. One should take care of his body by neglecting all other things because if body is not healthy then nothing is existing.

Word "Svastha' comprises of 'Sva' meaning one's own & 'Stha' means staying ie being in ones own natural state.

Definition of Health (Svastha निरुक्ति)

सुष्ठु निर्विकारत्वेनावतिष्ठति इति स्वस्थः । (च.पा. on च.सू. ५/१३)

The condition where the body is devoid of any abnornality is known as Healthy ie *svastha.*

स्वस्थस्य भावः स्वास्थ्य ।। (च.पा. on च.सू. ५/१३)

The feeling of healthiness is Health ie *svāsthya.*

समदोषः समाग्निश्च समधातुमलक्रियः। प्रसन्नात्मेन्द्रियमनाः स्वस्थ इत्यभिधीयते।।(सु.सू.१५/४१)

According to *Suśruta*, man is said to be *svastha* whose *doṣas*, *Agnis*, *dhāthus* and *malās* are in the state of equilibrium along with mental, sensory and spiritual pleasentness and happiness.

Balanced state of doṣas (Samadoṣa)

The equilibrium state of the *doṣas* is known as health and disequilibrium between the *doṣas* leads to illness.

Physiological variations of *doṣas* occur, which can be catagorised into different types.

वयोहोरात्रिभुक्तानां तेऽन्तमध्यादिगाः क्रमात् ।। (अ.हृ. १/८)

1. Daily (नित्यग)

- Morning- *Kapha* predominance
- Afternoon- *Pitta* predominance
- Night- *Vāta* predominance

2. Seasonal (ऋतवः) *Caya, Prakopa & Praśama* of doṣas occur seasonally.

3. Age (आवस्थिक)

- Childhood- *Bālya- Kapha*
- Middle Age- *Madhya- Pitta*
- Old age- *Vṛddhāpya- Vāta*

4. Food(भोजन)	Beginning of- intake of food.	*Madhura rasa* predominant	*Kapha* is predominent
	In the middle of- food consumption occurs	*Vidāha*	*Pitta vṛddhi*
	After the digestion- of food	*Vāta vṛddhi*	

To prevent diseases one should adopt the measures like daily regimen, seasonal regimen, proper diet, exercise, hygiene and codes of conducts mentioned in *Āyurveda*.

Balanced state of Agni (Samāgni)

The *Agni* should be in enquilibrium. *Agni* is one among **10** seats of *prāṇa*. *Jāṭharāgni* & *bhūtāgni* are responsible for proper digestion of food. *Dhātvāgnis* are responsible for nourishment of *dhātus*, equilibrium state of *Agni* leads to proper formation of body tissue and derangement of *Agni* leads to different diseases.

अग्निदोषान् मनुष्याणां रोगसंघाः पृथग्विधाः ।। (च.चि.१३/९)

Balanced state of excreta (Samadhātu mala kriyāh)

Equilibrium state of *dhātus* is essential for the maintenance of health & prevention of diseases. It is dependent on food consumed, regimens followed & state of *Agni*.

There should be proper formation & expulsion of three *mala* ie faeces, urine & sweat. Otherwise accumulated toxins produce different disorders.

Pleasent state of soul, senses and mind (Prasannātmendriya manah)

Pleasent state of soul, sense organs & mind is health. Here *Ātma* means *Jīvātma* or *Karma puruṣa* who experiences all feelings like pleasure pain etc. Even though soul is devoid of blemishes as he is in association with body, he experiences good & bad effects. All sense organs including mind should be devoid of vitiation. Procedures like *Abhyaṅga*, *Śirobhyaṅga*, *Pādābhyaṅga*, *Pādatra dhāraṇa*, *dhūmapāna*, *Añjana*, *Kavala*, *Gaṇḍūṣa*, *Kurṇapūraṇa*, etc. help to maintain the health of *Indriyas*.

Suppression of mental urges, like desire, hatred, greediness, passion, following principles of *sadvṛtta* (codes & conduct), *ācāra rasāyana* & *Yoga* help to keep the mind healthy. Thus one can prevent psychological, somatic & psychosomatic disorders.

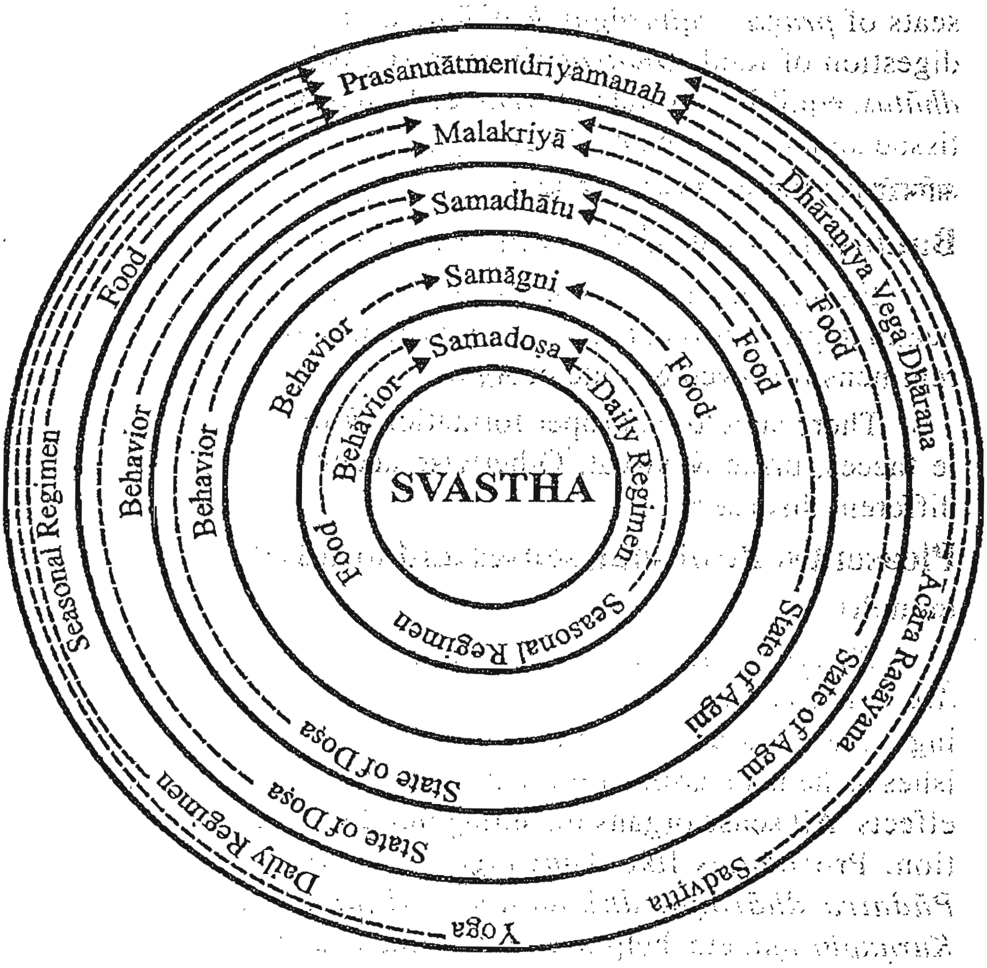
आरोग्यं दोषसमतां सर्वबाधानिवर्तनम् ।। (का.स.खि ५)

The balanced state of *doṣas* and absence of any abnormality is known as health.

विकारो धातु वैषम्यं साम्यं प्रकृतिरुच्यते। सुखसंज्ञकं आरोग्यं विकारो दुःखमेव च।।(च.सू.९/४)

Abnormal state of *dhāthus* which produces unhappiness is 'disease'., balanced state which produces happiness is *Prakṛti* or Health ie *Ārogya*.

Features of Health & Measures to be adopted to Maintain the health



According to WHO health is defined as "the complete state of physical, mental and social well being and not merely an absence of disease or infirmity"

Characteristics of Health
(स्वस्थ लक्षण)

Kāśyapa elaborates the features of health in *Khilasthāna.*

अन्नाभिलाषो भुक्तस्य परिपाकः सुखेन च । सृष्टविण्मूत्र वातत्वं शरीरस्य तु लाघवं ।।
सुप्रसन्नेन्द्रियत्वं च सुखस्वप्नप्रबोधनम् । बलवर्णायुषो लाभः सौमनस्यं समाग्निता ।।
विद्यादारोग्य लिङ्गानि विपरीते विपर्ययम् ।। (का.सं.खि ५/६)

Desire for the intake of food, proper and easy digestion of the ingested food, evacuation of faeces, urine and flatus properly, lightness in the body, pleasentness in sense organs, proper timely sleep and awakening, gain of strength, life and pleasent mind and normal *Agni* are the features of health and opposite state is illness.

अथेह भवास्य सांप्रतं द्विधैव तत् स्वास्थ्यं उदाहृतं जनैः ।
प्रधानमाद्यं परमार्थमित्यतो द्वितीयमन्यव्द्यवहार संभवं ।। (कल्याणकारक २/२)

Ugrāditya the auther of *Kalyāṇakāraka* describes two types of Health: the prime being ultimate health ie *paramārtha svāsthya* and the other general health *vyavahāra svāsthya.*

Features of ultimate health (Paramārtha svāsthya)

अशेषकर्मक्षयजं महाद्भुतं यदेतदत्यंतिकमद्वितीयम् ।
अतीन्द्रियं प्रार्थितमर्थवेदिभिः तदेवदुक्तं परमार्थनामकं ।। (क.का. २/३)

Due to decreased effects of past deeds, the soul experiences eternal happiness of liberation that is salvation, which is wonderful, never ending exceptional and desire of great people.

Features of general health (Vyavahāra svāthya)

समाग्निधातुत्वमदोषं विभ्रमो मलक्रियात्मेन्द्रियसुगसन्नता ।
मनः प्रसादश्च नरस्य सर्वदा तदेवमुक्तं व्यवहारजं खलु ।। (क.का. २/४)

The normalcy of *Agni, dhātu, doṣa, mala,* without any confusion blissful state of soul and mind is general health ie *vyavahāra svāsthya.*

Principles for Prevention of Diseases

उत्थायोत्थाय सततं स्वस्थेनारोग्यमिच्छता। धीमता यदनुष्ठेयं तदस्मिन् सम्प्रवक्ष्यते।।(सु.चि.२४/३)

The regimens to be followed after awakening from sleep to maintain health routinely are mentioned in *svasthavṛtta.*

There are two types of *svasthavṛtta.*

(1) *Vaiyaktika svasthavṛtta*- The principles that are to be followed by the individual to prevent diseases.

(2) *Sāmājika svasthavṛtta*- Principles to be followed by the community for the maintenance of health of the society.

1. मानवो येन विधिना स्वस्थस्तिष्ठति सर्वदा। तमेव कारयेद्वैद्यो यतः स्वास्थ्य सदेप्सितम्।।

(भा.प्र.५/१२)

Man should always follow those procedures which keep him healthy always, as health is always desired.

2. दिनचर्या निशाचर्या ऋतुचर्या यथोदितम्। आचारन् पुरुषः स्वस्थः सदा निष्ठति नान्यथा।।

(भा.प्र.५/१३)

Daily regimen, night regimen & seasonal regimens should be followed as mentioned to maintain health not other wise.

3. नित्यं हिताहार विहारसेवि समीक्ष्यकारी विषयेष्वसक्तः ।
दाता समः सत्यपरः क्षमावान् आप्तोपसेवी भवत्यरोगः ।। (अ.हृ.सू. ४/३६)

The person who always consumes wholesome food, practices wholesome habits, thinks, who is not interested in worldly matters, who sacrifices, who is always balanced towards all beings, forgives, speaks truth and who follows words of Āpta *(Āpta vacana)* does not develop any disease.

4. Food (आहार)

षष्ठिकान् शालि मुद्गान् सैन्धवामलक यवान् । अन्तरीक्षं पयः सर्पि जाङ्गलं मधुचाभ्यसेत् ।।
तच्च नित्यं प्रयुञ्जीत स्वास्थ्यं येनानुवर्तते। अजातानां विकाराणां अनुत्पत्तिकरं च यत्।।(च.सू.५/१२)

Caraka emphasises on food which are wholesome to the body like rice, green gram, rock salt, goose berry, barley, rain water, milk, ghee, meat and honey. These should be consumed regularly for maintenance of health and prevention of diseases.

The above reference can be taken as definition of balanced diet in *Āyurveda*, rice and barley as carbohydrate sources, green gram, meat as source of protein, ghee as fats, honey as source of sugar, rock salt as source of mineral, milk and goose berries as vitamin and mineral source which make the components of balanced diet.

5. Regimen (विहार)

त्यागः प्रज्ञापराधानां इन्द्रियोपशमः स्मृतिः। देशकालात्मविज्ञानं सद्वृत्तस्यानुवर्तनम् ।।

(अ.हृ.४/३३,च.सू.७/५३)

One should avoid *prajñāparādha* (intelluctual errors), take care of sense organs, by avoiding under utilization, wrong utilization & over utiligation of sense organs, one should have good memory,

knowledge about place, time and one self and should follow rules of Sadvṛtta to prevent diseases.

6. Purification of body (Ṛtu Śodhana)

शीतोद्भवं दोषचयं वसन्ते विशोधयान् ग्रीष्मजमभ्रकाले ।
घनात्यये वार्षिकमाशु सम्यक् प्राप्नोति रोगानृतुजात्र जातु ।। (अ.हृ.सू. ४/३५)
श्रावणे कार्तिके चैत्रे मासी साधारणे क्रमात् ।
ग्रीष्मवर्षा हिमाचितान् वाय्वादीनाशु निर्हरेत् ।। (अ.हृ.सू. १३/३३)

The diseases due to variations in the climate can be prevented by following purfication in respective seasons.

The *Kapha doṣa* produced due to effects of cold during *Hemanta* and *Śiśira ṛtu* should be expelled out in the beginning of *vasanta ṛtu* through emesis, *vāta* accumulated during *Grīṣma ṛtu* should be expelled in *Varṣā ṛtu* through *āsthāpana basti* and *pitta* accumulated during *Varṣā ṛtu* should be expelled in the beginning of *śarat ṛtu* by purgation and blood letting. These purificatory procedures prevent seasonal diseases.

Similary purification of *vāta, pitta* and *kapha* accumulated in *Grīṣma, Varṣā and Hemanta* should be done in the month of *śrāvaṇa*, *kārtika* and *Caitra* respectively.

7. रोगाः सर्वेऽपि जायन्ते वेगोदीरण धारणैः ।। (अ.हृ.४/२३)

All the diseases are produced by creation of unmanifested urges or suppression of natural urges. So one should always avoid both to maintain the health.

8. तस्मात् प्रागेव रोगेभ्यो रोगेषु तरुणेषु वा। भेषजैः प्रतिकुर्वीत य इच्छेत् सुखमात्मनः।।(च.सू.११/६३)

One who is desirous of his own well being, should take appropriate treatment while disease is in intial stages.

9. अनुत्पत्त्यै समासेन विधिरेषः प्रदर्शितः। निजागन्तु विकाराणां अनुत्पन्नां च शान्तये।।(च.सू.११/६४)

These are the measures in short which help in prevention and cure of *nija* and *Āgantu* variety of disease.

The above mentioned 7 points can be taken as aspects of primary prevention dealt in *Āyurveda*. 8th point can be related to secondary prevention.

रसायनं च तज्ज्ञेयं यज्जराव्याधि विनाशनं ।। (शा.सं.पू. ४/१४)

The rejuvenation therapy *(Rasāyana cikitsa)* is used in the prevention and cure of diseaes as well as prevention of old age. *Kāśyapa* has mentioned about concept of *Bālarasāyana* to enhance the immunity.

Chapter- 1

DAILY REGIMEN

Definition (निरुक्ति)

दिने दिने चर्या दिनचर्या । (अ.हृ.२/१ सर्वाङ्गसुन्दर टीका)
आचारादायुर्लभ्यते इत्याचार्याः । (स.सु. *on* अ.हृ. २/१)

Aruṇadatta in his commentary gives the definition as the regimens done daily. He further elaborates that these regimens are performed to prolong life span.

These daily regimens are indicated for following reasons

1. Maintenance of Hygiene — शुचिता
2. Brighten the Indriyas — सुप्रसन्नेन्द्रियता
3. Strengthen the body — बललाभ
4. Promote the Health & longevity — आयुषो लाभ
5. Keep the mind at peace & harmony — सौमनस्यता

Daily regimens begin with getting up from the bed till one goes to his bed in the night.

Awakening early in the morning (ब्राह्मी मुहूर्ते उत्तिष्ठे)

ब्राह्मे मुहूर्ते उत्तिष्ठेत्स्वस्थो रक्षार्थमायुषः ।। (अ.हृ.सू. २/१)

One desirous of long healthy life should get up in *Brahma muhūrta*. One should analyse about the digestion of the food taken previous night and get up in the early morning, look in to the mirror and evacuate the natural urges facing towards north in proper place.

Aruṇadatta commenting on *Brahmi muhūrta* mentions.

ब्रह्मं ज्ञान तदर्थमध्ययनाद्यपि ब्रह्म, तस्य योग्यो मुहूर्तो ब्राह्मः । (स.सु. *on* अ.हृ.सू. २/१)

Brahma is knowledge, which is gained by reading. The time which is ideal for the gain of knowledge is *Brahma muhūrta*.

रात्रेरुपान्त्यो मुहूर्तो ब्राह्मः । (आ.र. *on* अ.हृ.सू. २/१)

Hemādri commenting on the same verse considers it as last part of night ie time just prior to sun rise.

Usually during this time environment is clean without much of pollutants. Along with the clean air, pleasent almosphere, absence of noise, the morning rays of the rising sun is very beneficial, so only mentioned else where as आरोग्यं भास्करादिच्छेत् ।।

Health is got from the sun. So one should get up early in the morning before sunrise.

Sipping of water (Ācamana)

स्पृष्ट्वा धातून् मलानश्रु वसाकेशनखांश्च्युतान् । स्नात्वा भोक्तुमना भुक्त्वा सुप्त्वा क्षुत्वा सुरार्चने ।।
रथ्यामाक्रम्य चाचमेदुपविष्ट उदङ्मुखः । प्राङ्मुखो वा विविक्तस्थो न बहिर्जानु नान्यदृक् ।।
अजल्पन्नुत्तरासङ्गी स्वच्छेरङ्गुष्ठ मूलगैः । नोद्धृतैर्नानतो नोर्ध्वं नाग्निपक्वैर्न पूतिभिः ।।
न फेनबुद्बुदक्षारैर्नैकहस्तार्पितैर्जलैः।नार्द्रैकपाणिर्नामिध्यहस्तपादो न शब्दवन्। ।(अ.हृ.सं.३/९-१२)

One should sit facing towards north or eastern direction and sip water after cleaning the excreta of *dhātus*, tears, after taking bath, after eating, after sleeping, after sneezing, after worship & after travelling. The place for ācamana should be lonely. It should be practiced with full concentration, without speaking & wearing a cloth over shoulder. The water should be taken upto thumb and sipped without making any sound, without spilling, the person should be in erect posture & the water should be devoid of bad odour, froth & alkalinity. The hands should be clean.

Brushing of Teeth (दन्तधावन)

अर्कन्यग्रोध खदिर करञ्ज ककुभादिजम् । प्रातर्भुक्त्वा च मृद्वग्रं कषायकटुतिक्तकम् ।।
कनीन्यग्र समस्थौल्यं प्रगुणं द्वादशाङ्गुलम्। भक्षयेद्दन्तपवनं दन्तमांसान्यबाधयन्। ।(अ.हृ.सू.२/२-३)

One should brush in morning and night after intake of food with twigs of *Arka, vaṭa, khadira, karañja* and *Arjuna*. Thickness should be of little finger, length should be of twelve angula. One end is made like a brush by chewing and the teeth should be brushed without injuring the gums.

Technique of brushing teeth

दन्तान् पूर्वमधो घर्षेत् प्रातः ।। (अ.सं.सू ३/२२)

One should brush in the verticle direction from bottom to top.

Selection of drugs for teeth brushing

अवेक्ष्यंतु च दोषं च रसं वीर्यं च योजयेत् । कषायं मधुरं तिक्तं कटुकं प्रतरुत्थितः ।।
निम्बश्च तिक्तके श्रेष्ठः कषाये खदिरस्तथा । मधूको मधुरे श्रेष्ठः करञ्जः कटुके तथा ।।
(सु.चि. २४/६)

The selection of twigs for tooth brush should be done on the basis of season, *doṣa, rasa* and *vīrya* after getting up. *Nimba (Neem)* is best among bitter ones, *khadira* (Accasia) is the best among astringent drugs, *Madhuka* is the best among sweet drugs and *Karañja* is the best among the pungent drugs.

Ideal nature of drugs

अयुग्मग्रन्थि यच्चापि प्रत्यग्रं शस्तभूमिजम् ।। (सु.चि २४/५)

Twig should be devoid of branches and knots, it should be grown in good land and every day new twig should be used for tooth brushing.

Benefits

तद्दौर्गन्ध्योपदेहौ तु श्लेष्माणं चापकर्षति। वैशद्यमन्नाभिरुचिं सौमनस्यं करोति च।।(सु.चि.२४/९)

It brings about freshness, takes away bad odour and coating on teeth. It produces alleviation of *Kapha*, clearness in the mouth & desire for food.

In absence of twigs

Powders of *Triphala, Trikaṭu* and *Trijātaka* can be used.

Contra indications

नाद्यादजीर्णवमथुश्वासकास ज्वरार्दिती। तृष्णास्यपाक हृन्नेत्र शिरःकर्णामयी च तत् ।।(अ.हृ.सू.२/४)

One suffering from indigestion, vomiting, difficulty to breath, cough, fever, facial paralysis, excessive thirst, mouth ulceration, diseases of heart, eye, head and ear are contraindicated for teeth brushing.

Tongue cleaning (जिह्वानिर्लेखन)

जिह्वानिर्लेखनं रौप्यं सौवर्णं वार्क्षमेव च । तन्मलापहरं शस्त्रं मृदु श्लक्ष्णं दशाङ्गुलम् ।।
मुख वैरस्य दौर्गन्ध्यशोफजाड्यहरं सुखम् । दन्तदार्ढ्यकरं रुच्यं स्नेहगण्डूष धारणम् ।।
(सु.चि.२४/१३-१४)

Tongue cleaning should be done with the help of instrument which is smooth, soft, 10 aṅgula in length made of silver, gold or iron.

Benefits

It removes bad taste, odour of mouth, cures oedema, stiffness of tongue and gives taste. Gargling with oil strengthens the teeth.

Gargling (गण्डूषा)

असंचार्या तु या मात्रा गण्डूषः सः प्रकीर्तितः ।। (सु.चि. ४०/६२)

Mouth is completely filled with *gaṇḍūṣa* dravya and kept without movement in gargling or *gaṇḍūṣa*.

तत्र द्रवेण गण्डूषः ।। (शा.उ.१०/४)

Liquids are used in *Gaṇḍūṣa* (Gargling).

Types

According to *Vāgbhaṭa*		According to *Suśruta*	
1. *Snigdha*	- *Vāta*	*Snigdha*	- *Vāta*
2. *Śamana*	- *Pitta*	*Prasāda*	- *Pitta*
3. *Ropaṇa*	- *Vraṇa*	*Śodhi*	- *Kapha*
4. *Śodhana*	- *Kapha*	*Ropaṇa*	- *Vraṇa*

Method (विधि)

Gaṇḍūṣa should be done with concentration. Liquid should be kept in the mouth till *doṣa* gets filled in the mouth or before eye starts watering.

Different liquids used for gargling

1. Snigdha Gaṇḍūṣa– Unctous substance having sweet, sour & salt taste are used to alleviate vāta.

2. Prasādana/Śamana Gaṇḍūṣa– Sweet and bitter tastes & cold quality drugs are used to pacify pitta.

3. Śodhana– Drugs having hot and dry quality are used to expel *kapha*.

4. Ropaṇa– Bitter, sweet & astringent tastes having healing property are used to heal the wounds.

For *Gaṇḍūṣa* unctous substances like *sneha*, milk, honey, water, *śukta*, alcohol, meat soup, wine, rice gruel and decoctions are used in hot or cold conditions.

Daily regimen

गण्डूष धारणे नित्य तैलं मांसरसोऽथवा ।। (अ.हृ.सू.२२/१-०)

Every day *Gaṇḍūṣa* is ideally done with oil or meat soup.

Benefits of gargling (Gaṇḍūṣā)

हन्वोर्बलं स्वरबलं वदनोपचयः परः । स्यात्परं च रसज्ञानेमन्ने च रुचिरुत्तमा ।।
न चास्य कण्ठशोषः स्यान्नौष्ठयौः स्फुटनात् भयम्। न च दन्ता क्षयं यान्ति दृढमूला भवन्ति च ।।
न शूल्यन्ते न चाम्लेन हृष्यन्ते भक्षयन्ति च । परानपिखरान् भक्ष्यान् तैल गण्डूष धारणात्।।

(च.सू. ५/७८-६०)

Practice of *Gaṇḍūṣa* enhances strength of mandible, resonance of voice, nourishment of face, taste sensation & gives good taste. It prevents dryness of throat, cracking of lips, decay of teeth & makes the teeth strong. Person does not experience pain, tingling sensation after eating sour food or hard food.

Features of proper gargling (गण्डूषा सम्यक् योग)

व्याधिरपचयस्तुष्टिर्वैशद्यं वक्त्र लाघवं। इंद्रियाणां प्रसादश्च कवले शुद्धि लक्षणं।। (सु.चि.४०/६४)

The alleviation of disease, proper nourishment, clarity of mouth, lightness of sense organs & clarity of sense organs are the features of proper *kavala* & *Gaṇḍūṣa*.

Features of improper gargling (गण्डूषा अयोग)

हीने जाड्य कफोत्क्लेशावरसज्ञानमेव च । (सु.चि. ४०/६५)

Improper *(Hīna yoga) Gaṇḍūṣa* leads to diseases, excess of *kapha* in the mouth & improper perception of taste.

Features of excess of gargling (गण्डूषा अतियोग)

अतियोगात् मुखपाकः शोषस्तृष्णा-रुचिक्लमाः ।। (सु.चि. ४०/६५)

Excess of *Gaṇḍūṣa* leads to mouth ulceration, disease in the mouth, excessive thirst & tastelessness.

Mouth wash (कवल)

सुखं सञ्चार्यते या तु मात्रा सा कवलः स्मृतः ।। (सु.चि. ४०/६२)

The material used moves easily in the mouth in *Kavala*.

कल्केन कवलः स्मृतः । (शा.उ.१०/४)

According to *Śārṅgadhara* medicated pastes are used for the purpose of *Kavala*.

Types

According to *Suśruta*

1. *Snaihika*	-	*Vāta*	3. *Śodhana*	-	*Kapha*
2. *Prasādi*	-	*Pitta*	4. *Ropaṇa*	-	*Vraṇa*

Method of practicing is same as *Gaṇḍūṣa*, the only difference is that amount is less in *Kavala*.

Benefit

Similar to gargling.

Collyrium (अञ्जन)

सर्वेन्द्रियाणां नयनं प्रधानं ।

Eye is most important among all the sense organs. So to protect it one should apply collyrium every day.

अतः ऊर्ध्वं शरीरस्य कार्यमक्ष्यञ्जनादिकम्। स्वस्थवृत्तमभिप्रेत्य गुणतः संप्रवक्ष्यते।।(च.सू.५/२४)

For the maintenance of positive health, the most important measure like application of collyrium should be done daily.

Variety

1. According to *Caraka*– *Sauvīrāñjana, Rasāñjana*
2. According to *Suśruta*–
   - *Prasādana*
   - *Lekhana*
   - *Ropaṇa*
3. Depending on form of medicine used–
   Guṭika, Rasāñjana, Cūrṇāñjana
4. Depending on Action–
   - *Mṛdu*
     - *Ropaṇa*
     - *Snehana*
     - *Prasādana*
   - *Tīkṣṇa* — *Lekhana*

Time of application

सौवीरमञ्जनं नित्यं हितमक्ष्णोः प्रयोजयेत्। पञ्चरात्रेऽष्टरात्रे वा स्रावणार्थे रसाञ्जनम् ।।
(च.सू.५/१५)

One should apply collyrium made of antimony every day for protecting the eyes. Collyrium made of (Berberis aristata DC) is applied once in five or eight days at night time for lacrymation of eyes.

चक्षुस्तेजोमयं तस्य विशेषाच्छ्लेष्मतो भयम् । ततः श्लेष्महरं कर्म हितं दृष्टेः प्रसादनम् ।।
दिवा तन्न प्रयोक्तव्यं नेत्रयोस्तीक्ष्णमञ्जनम् । विरेक दुर्बला दृष्टिरादित्यं प्राप्य सीदति ।।
तस्मात् स्राव्यं निशायां तु ध्रुवमञ्जनमिष्यते ।। (च.सू. ५/१६-१७)

Eyes are dominant in tejo *mahābhūta*, so there is fear of being afflicted with *kapha*. Hence process which alleviates *kapha* is good for eyes, strong collyrium should not be used in day time, as the eyes weakened by drainage will be afflicted by sun. Thus the collyrium meant for drainage should be always applied at night.

Method of application of Collyrium

वामेनाक्षि विनिर्भुज्य हस्तेन सुसमाहितः । शलाकया दक्षिणेन क्षिपेत् कनीनमञ्जनम् ।।
अपाङ्गय वा यथायोगं कुर्याच्चापि गतागतम् ।। (सु.उ.१८/६४)

One should widen the eyes with left hand & apply collyrium with *śalāka* by using right hand. Always it should be applied from inner canthus to the outer canthus.

Benefits of application of collyrium

यथा हि कनकादीनां मलिनां विविधात्मनाम् । धौतानां निर्मला शुद्धिस्तैलचेलकचादिभिः ।।
एवं नेत्रेषु मर्त्यानामञ्जनाश्च्योतनादिभिः । दृष्टिर्निराकुला भाति निर्मले नभसीन्दुवत् ।।
(च.सू.५/१८-१९)

The gold ornaments are cleaned by means of oil, cloth & hair brush, similarly application of collyrium etc cleans the human eyes, which makes them shine like the bright moon in the clear sky.

Features of proper collyrium application

विशद लघ्वनास्रावि क्रियापटु सुनिर्मलम् । सशान्तोपद्रवं नेत्रं विरिक्तं सम्यगादिशेत् ।।

Clear vision, lightness, no excessive lacrymation, proper functioning, purity of eyes & alleviation of disease are the features of proper action of collyrium.

Contra indications for collyrium

श्रमौदावर्तरुदितमद्यक्रोधभयज्वरैः । वेगाघातशिरोदोषैश्चार्तानां नेष्यतेऽञ्जनम् ।।
रागदुरुक्तिमिरास्रावमूलसंरंभसंभवान् ।। (सु.उ. १८)

One should not apply collyrium in the conditions of tiredness, *udāvarta*, crying, after intake of alcohol, anger, fear, fever, suppression of natural urges & diseases of head. It is also contra indicated in ocular conditions like redness of eyes, pain, blindness *(Timira)*, excessive lacrymation, pain and swelling.

Smoking (धूमपान)

श्लेष्मा शिरस्थः स तु पीतमात्रे धूमे प्रशान्ति लभते क्षणेन ।

Part of vitiated kapha situated in the head is eliminated very fast by smoking. So after application of collyrium smoking is prescribed.

Variety (भेद)

1. *Prāyogika* 2. *Vairecanika* 3. *Snaihika*
4. *Kāsaghna* 5. *Vāmanīya*

Definition (निरूक्ति)

धूम अभ्यवहारमोक्षाः धूमपानम् ।। (च.पा. च.सू. ५/३५)

Inhalation of smoke & exhalation is known as *Dhūmapāna*.

धूमं पीयते इति धूमपानं । (च.पा. च.सू. ५/३५)

Drinking of smoke is *Dhūmapāna* or smoking.

Method

मुखेन तं पिबेत्पूर्वं नासिकाभ्यां ततः पिबेत् । मुखपीतं मुखेनैव वमेतपीतं च नासया ।।
मखेन धूममादाय नासिकाभ्यां न निर्हरेत्। तेन हि प्रतिलोमेन दृष्टिस्तत्र निहन्यते।। (सु.चि.४०/)

First take smoke through nostril & then through mouth, both the times smoke should be taken out through the mouth. If it is taken out through nostrils, then it is harmful for the vision. One should sit in a comfortable posture with a pleasent mind, smear the end of *Dhūma varti* with ghee or oil, ignite it & place it in *Dhūmanetra*, which is the instrument used for smoking.

Time for smoking

प्रयोगपाने तस्याष्टौ कालाः संपरिकीर्तिताः । वातश्लेष्मसमुत्क्लेशः कालेष्वेषु हि लक्ष्यते ।।
स्नात्वा भुक्त्वा समुल्लिख्य क्षुत्वा दन्तान्निघृष्य च । नावनाञ्जन निद्रान्ते चात्मवान् धूमपो भवेत् ।।
(च.सू. ५/३३-३५)

In the daily regimen always *Prāyogika* variety of smoking is adviced, during the following times for vitiated *vāta* & *kapha*.

One should smoke after bathing, eating, tongue scraping, sneezing, brushing teeth, *nasya*, collyrium & sleep.

Benefits of smoking

गौरवं शिरसः शूलः पीनसार्धावभेदकौ । कर्णाक्षिशूलं कासश्च हिक्काश्वासौ गलग्रहः ।।
दन्तदौर्बल्यमास्रावः श्रोत्रघ्राणाक्षिदोषजः । पूतिर्घ्राणास्यगन्धश्च दन्तशूलमरोचकः ।।
हनुमन्याग्रहः कण्डूः क्रिमयः पाण्डुता मुखे । श्लेष्मप्रसेको वैस्वर्यं गलशुण्ड्युपजिह्विका ।।
खालित्यं पिञ्जरत्वं च केशानां पतनं तथा । क्षवथुश्चातितन्द्रा च बुद्धेर्मोहोऽतिनिद्रता ।।
धूमपानात् प्रशाम्यन्ति बलं भवति चाधिकम् । शिरोरुह कपालानां इन्द्रियाणां स्वरस्य च ।।
धूमवक्त्रकपानस्य व्याधयः स्युः शिरोगताः । (च.सू. ५/२७-३२)

Smoking cures heaviness of head, head ache, rhinitis, half sided headache, pain in the eyes, ear, cough, hiccough, dyspnoea, obstruction of throat, weakness of teeth, discharge from ear, nose & eyes, bad odour from nose & mouth, tooth ache, anorexia, lock jaw, stiffness of neck, itching, infection, paleness, excessive salivation, change in voice, tonsilitis, uvulitis, baldness, graying of hair, hair fall, sneezing, drawsiness, loss of consciousness and excessive sleep. It strengthens hair, skull bones, sense organs & voice. It prevents strong vāta kapha disorders occuring above the shoulders.

Complications of improper smoking

बाधिर्यमान्ध्यमूकत्वं रक्तपित्तं शिरोभ्रमम्। अकाले चातिपीतश्च धूमः कुर्यादुपद्रवान्।।(च.सू.५/३८)

Smoking in excess or at improper time, produces complications like deafness, blindness, dumbness, bleeding from different parts of body *(Rakta pitta)* & giddiness.

Contra indications for smoking

परं त्वतः प्रवक्ष्यामि धूमो येषां विगर्हितः । न विरिक्तः पिबेत् धूमं न कृते बस्ति कर्मणि ।।
न रक्ती न विषेणार्तो न शोचन्न च गर्भिणी । न श्रमे न मदे नामे न पित्ते न प्रजागरे ।।
न मूर्धाभ्रमतृष्णासु न क्षीणे नापि च क्षते । न मद्यदुग्धे पीत्वा च न स्नेहं न च माक्षिकम् ।।
धूमं न भुक्त्वा दध्ना च न रूक्षःक्रुद्धः एव च । न तालु शोषे तिमिरे शिरस्याभिहते नच ।।
न शङ्खके न रोहिण्यां न मेहे न मदात्यये । एषु धूममकालेषु मोहात् पिबति यो नरः ।।
रोगास्तस्य प्रवर्धन्ते दारुणा धूमविभ्रमात् ।। (च.सू. ५/४१-४५)

Now I shall explain the conditions where smoking is contraindicated. After purgation or emesis, enema, bleeding disorder, poisoning, grief & pregnancy, tiredness, intoxicated by alcohol, *āma, pitta* disorders, night awakening, unconsciousness, giddiness, excessive thirst, emaciation & injury the smoking should be avoided.

One should not smoke after taking alcohol, milk, unctous substances, honey & curds. One should avoid smoking during anger, diseases of palate, blindness, head injuries, *śaṅkhaka* a variety of head ache, *rohiṇi*, diabetes & intoxication.

In these conditions if one smokes, he suffers from different complicated diseases due to effects of smoking.

Features of proper smoking

यदा चोऽरश्च कण्ठश्च शिरश्च लघुतां व्रजेत् । कफश्च तनुतां प्राप्तः सुपीतं धूममादिशेत्।।
(च.सू.५/५२)

Lightness of the chest, throat, head & liquifaction of *kapha* are the features of proper smoking.

Features of improper smoking

अविशुद्धः स्वरो यस्य कण्ठश्च सकफो भवेत् । स्तिमितो मस्तकश्चैवं अपीतं धूममादिशेत् ।।
(च.सू.५/५३)

Features of insufficient smoking are absence of clarity of voice, presence of *kapha* in throat and heaviness of the head.

Features of excessive smoking

तालु मूर्धा च कण्ठश्च शुष्यते परितप्यते । तृष्यते मुह्यते जन्तू रक्तं च स्रवतेऽधिकम् ।।
शिरश्च भ्रमतेऽत्यर्थं मूर्छा चास्योपजायते । इन्द्रियाण्युपतप्यन्ते धूमेऽत्यर्थं निषेविते।।
(च.सू.५/५४-५५)

Excessive smoking produces dryness of palate, head & throat, excess thirst, unconsciousness, bleeding disorders, excessive discharge, giddiness, fainting & loss of proper functioning of sense organs.

Nasal drops (नस्य)

यदुत्तमाङ्गमङ्गानां शिरस्तदभिधीयते ।।

Head is considered as the most important part of the body.

नासाहि शिरसो द्वारं तेन तद्व्याप्ति हन्तितान् ।। (अ.हृ.सू.२०/१)

Nose is the entry way for the head & medicine used in the form of nasal instillation, cures the diseases of the head through this route only.

Definition (निरुक्ति)

औषधं औषधसिद्धं स्नेहो वा नासिकाभ्यां दीयते इति नस्यं ।। (सु.चि.४०/२१०)

Medicine or medicated fat is administered through nostril. This is known as *Nasya*.

नासायां भवं नस्यं ।। (स.सु. *on* अ.हृ.सू २०/१)

That which is instilled through nose is *Nasya*.

Variety (भेद)

According to *Suśruta*	Subdivided into
1. *Śirovirecana*	1. *Nasya*
2. *Snehana*	2. *Śirovirecana*
	3. *Pratimarśa*
	4. *Avapīḍa*
	5. *Pradhamana*

According to Vāgbhaṭa

1. *Virecana*	*Śārṅgadhara* 1. *Marśa*
2. *Bṛṁhaṇa*	2. *Pratimarśa*
3. *Śamana*	

Nasya indicated as *daily* regimen is *pratimarśa nasya*.

प्रतिमर्शो भवेत् स्नेहो निर्दोषः उभयार्थकृत् ।। (च.सि. ९/१२)

प्रतिमर्शस्तु नस्यार्थं करोति न च दोषवान्। ततः स्नेहांगुलिं दद्यात् प्रातर्निशि च सर्वदा ।।
न चोच्छिद्येदरोगाणां प्रतिमर्शः सदार्ढ्यकृत् ।। (च.सि. ९/११७)

Pratimarśa type of *Nasya* is devoid of any complications. The finger should be dipped in oil & drop should be instilled into the nostril. This should be inhaled inside, which makes the body strong. As the amount is only two drops or minute amount, it is deviod of any complications & administered at any time.

वर्षेवर्षेऽणुतैलं च कालेषु त्रिषु ना चरेत् । प्रावृट्शरत्वसन्तेषु गतमेघे नभस्तले ।। (च.सू.५/५६)

One should inhale *Aṇu taila*, during three seasons ie *prāvṛt*, *śarat* & *vasanta*, when the sky is devoid of clouds.

अणूनां स्रोतसां हितं इत्यणुतैलं ।। (च.पा. on च.सू. ५/३६)

Aṇu taila is specially indicated as it is conducive for minute channels (*srotas*).

Time for pratimarśa Nasya

1. After sleep	तल्पोत्थित
2. Teeth brushing	दन्तप्रक्षालित
3. While going out	गृहान्निर्गछत:
4. After exercise	व्यायामोत्तर
5. After sexual intercourse	व्यवायोत्तर
6. When tired due to walking	अध्वपरिश्रान्त काल
7. After evacuation of bladder	मूत्राच्चारन्ते
8. After evacuation of bowels	मलविसर्जनान्ते
9. After *kavala*	कवलान्ते
10. After *Añjana* (collyrium)	अञ्जनान्ते
11. After food	भोजनोत्तर
12. After emesis	वमनान्ते
13. After day sleep	दिवास्वप्नान्ते
14. In the evening	सायं

Benefits of Nasal drops

नस्य कर्म यथाकालं यो यथोक्तं निषेवते । न तस्य चक्षुर्न घ्राणं न श्रोत्रमुपहन्यते ।।
न स्युः श्वेता न कपिलाः केशाः श्मश्रूणि वा पुनः । न च केशाः प्रमुच्यन्ते वर्धन्ते च विशेषतः।।
पीनसार्धावभेदौ च शिरःकम्पश्च शाम्यति ।।
सिराः शिरःकपालानां सन्धयः स्नायुकण्डराः।नावन प्रीणिताश्चास्य लभन्तेभ्यधिकं बलम्।।
मुखं प्रसन्नोपचितं स्वरः स्निग्धः स्थिरो महान् । सर्वेन्द्रियाणां वैमल्यं बलं भवति चाधिकम् ।।
न चास्य रोगाः सहसा प्रभवन्त्यूर्ध्वजत्रुजाः। जीर्यतेश्चोत्तमाङ्गेषु जरा न लभते बलम् ।।
(च.सू.५/५७-६२)

Practice of *Nasya* at proper time as said in the text prevents diseases of eyes, nose & ears. There will be no white or grey hair, no hair fall, instead they grow well. It cures stiffness of neck, head ache, facial paralysis, stiffness of jaws, rhinitis, half sided head ache & tremors of head. Veins, skull bones, joints, ligaments & tendons are nourished by nasya & become strong. His face becomes pleasent and nourished, voice becomes sweet, deep & loud, clear-ness in sense organs & strength get enhanced. He will not be

afflicted with diseases of head & neck easily, even in old age he will be strong & will not be afflicted with diseases of head.

Features of proper Nasya

योगे लाघवः शिरसो सुख स्वप्न प्रबोधनं । विकारोपशयः शुद्धिरिन्द्रियाणां मनः सुखम्।।
(सु.चि.४०/३३)

Lightness of head, proper sleep & awakening, cure of diseases & clearity of organs & pleasent mind are the features of proper nasal instillation.

Features of insufficient Nasya

अयोगे वात वैगुण्यं इन्द्रियाणां रूक्षता । रोगाशान्तिश्च तत्रेष्टं भूयो नस्यं प्रयोजयेत् ।।
(सु.चि.४०/३५)

In condition of insufficient *Nasya, vāta* gets vitiated and produces dryness of sense organs. The disease does not get cured.

Features of excessive Nasya

कफ प्रसेको शिरसो गुरुतेन्द्रिय विभ्रमः । लक्षणं मूर्द्धयति स्निग्धे रूक्षं तत्रावचरेत् ।।
(सु.चि. ४०/३४)

Excessive secretions of *kapha*, salivation, heaviness of head, heaviness in sense organs & giddiness are the features of excess of *nasya* & should be treated by *Rūkṣaṇa* therapy.

Exercise (व्यायाम)

Definition

शरीरायास जननं कर्म व्यायामसंज्ञितम् ।। (सु.चि. २४/३८)

The action which produces tiredness in the body is *vyāyāma*.

शरीरचेष्टा या चेष्टा स्थैर्यार्था बलवर्धिनी । देह व्यायाम संख्याता मात्रया तां समाचरेत् ।।
(च.सू.७/३१)

The physical action, which enhances the strength of the body, when performed in the required amount is called as *Vyāyāma* or exercise.

व्यायामः स्थैर्यकराणां ।। (च.सू. २५/४०)

Exercise is the best among strength promoters.

Feature of proper exercise

स्वेदागमः श्वासवृद्धिर्गात्राणां लाघवं तथा । हृदयाद्युपरोधश्च इति व्यायामलक्षणम् ।।
(च.सू.७/३४)

Sweating, increased respiration rate, lightness in the body and increased heart beat are the features of proper exercise.

Benefits of exercise

लाघवं कर्मसामर्थ्यं स्थैर्यं दुःखसहिष्णुता। दोषक्षयोऽग्निवृद्धिश्च व्यायामादुपजायते ।।
(च.सू.७/३२)

Lightness of the body, ability to work, stability, increased endurance power, alleviation of *doṣa* (*kapha*), increased *Agni* are the benefits of exercise (*Vyāyāma*).

शरीरोपचयः कान्तिर्गात्राणां सुविभक्तता । दीप्ताग्नित्वमनालस्यं स्थिरत्वं लाघवं मृजा ।।
(सु.चि.२४/३९)

श्रमक्लमपिपासोष्णशीतादीनां सहिष्णुता । आरोग्यं चापि परमं व्यायामादुपजायते ।।
न चास्ति सदृशं तेन किञ्चित् स्थौल्यापकर्षणम्।न च व्यायामिनं मर्त्यमर्दयन्त्यरयो बलात् ।।
न चैनं सहसाऽऽक्रम्य जरा समधिरोहति । स्थिरी भवति मांसं च व्यायामाभिरतस्य च ।।
व्यायामस्विन्नगात्रस्य पद्भ्यामुद्वर्तितस्य च । (सु.चि. २४/३९-४२)

Exercise nourishes the body, gives good complexion, proportionate body parts, enhances the agni, takes away laziness, provides lightness, purifies the body, enhances tolerance power to tiredness, heat & cold. It also gives good health. No other measure is equivalent to exercise in obesity, even the enemies can't harm due to fear, old age sets in late. Body becomes sturdy, muscles become strong in person practicing exercise regularly.

Indications for Exercises

शीतकाले वसन्ते च मन्दमेव ततोऽन्यादा।तं कृत्वानुसुखं देहं मर्दयेच्च समन्ततः।। (अ.हृ.२/१२)

Excluding cold seasons & *vasanta ṛtu*, one has to do mild exercise & to prevent body pain massage should be done accordingly.

Effects of excessive exercise

तृष्णा क्षयः प्रतमको रक्तपित्तं श्रमः क्लमः। अतिव्यायामतः कासो ज्वरश्छर्दिश्च जायते ।।
व्यायामजागराध्वस्त्रीहास्य भाषादि साहसं । गजं सिंह इवाकर्षन् भजन्नति विनश्यति ।।
(अ.हृ.२/१०-१४)

Excessive exercise leads to diseases like thirst, emaciation, difficulty to breath, bleeding (*rakta pitta*), tiredness (*klama*), cough, fever & vomiting. Excessive exercise, awakening at night, excessive sexual intercourse, speaking and overstraining destroy the person, as lion which tries to drag the elephant gets destroyed.

Mild exercise (Caṅkramaṇa चङ्क्रमणम्)

यत्तु चङ्क्रमणं नातिदेह पीडाकरं भवेत्।तदायुर्बलमेधाग्निप्रदमिन्द्रियावबोधनम्।। (सु.चि.२४/८०)

It is a variety of exercise which does not cause any kind of trouble to the body. It increases life span, strength, intelligence, fire and perceptive power of sense organs.

Effects of exercise on the body

1. Respiratory system– By exercise rate of respiration gets increased, along with deep breathing the pulmonary circulation becomes faster resulting in increased intake of oxygen.

2. Circulatory system– The force & rate of heart beat enhance. Regular exercise enhances circulation of blood & lymph. It enhances the oxygen supply to the body tissues.

3. Musculosteletal system– The exercise tones up muscles, enhances the strength & makes them stout & strong. The muscle nutrition gets improved & growth of muscles also improve.

4. Cuteneous system– The perspiration rate is increased.

5. Elementary system– The exercise enhances appetite and assimilation of food. The bowel movements are regulated, thus prevents constipation.

6. Urinary system– Quantity of urine is diminished but blood urea level is unaltered. Excretion of uric acid is enhanced.

7. Nervous system– The mind is refreshed and power of observation, precision & talerance get enhanced.

Effects of excessive exercise

It causes nervous & muscular fatigue. It causes breathlessness, fatigue, palpitation, hypertrophy of left ventricle & reduction of pulse rate. The voluntary muscles get exhausted due to lack of oxygen supply & nutrients.

Massage (अभ्यङ्ग)

It is made of two words अभि+अङ्ग– Meaning movement towards the *dhātu*. Here the oil applied to the skin nourishes even the dhātus depending on the duration of *Abhyaṅga*.

स्पर्शनेऽभ्यधिको वायु स्पर्शनं चत्वगाश्रितं। त्वच्यश्च परमोभ्यङ्गः तस्मात्तं शीलयेन्नरः।।

(च.सू.५/८७)

Vāyu resides in skin & is abode of touch sense. Abhyaṅga is good for skin & one should do it every day.

Procedure of massage

One should massage the body with luke warn oil, according to the season in the direction of the body hair. Oil can be used according to the seasons, *doṣa* & condition. It is performed in seven positions in order.

1. Sitting position 2. Supine position 3. Left lateral position
4. Prone position 5. Right lateral position 6. Supine position
7. Sitting with legs extended to the front.

Duration of massage & effects on the body

(1 *mātra* = 19/60 seconds)

300 *mātra* (94 sec)- upto hair root (*Romānta*)

400 *mātra* (133 sec) upto skin (*Tvaca*)

500 *mātra* (160 sec) upto blood (*Rakta*)

600 *mātra* (190 sec) upto flesh (*māṁsa*)

700 *mātra* (228 sec) upto fat (*medas*)

800 *mātra* (240 sec) upto bones (*asthi*)

900 *mātra* (285 sec) upto bone marrow (*majjā*)

Totally massage upto 5 minutes for each part of the body is ideal.

Benefits of massage

अभ्यङ्गमाचरेन्नित्यं स जराश्रम वातहा । दृष्टिप्रसादः पुष्ट्यायुः स्वप्नसुत्वक्त्वदार्ढ्यकृत् ।।
शिरः श्रवण पादेषु तं विशेषेण शीलयेत् । (अ.हृ.सू. २/७)

Daily practice of *Abhyaṅga* delays ageing, cures tiredness & *vāta* disorders, improves vision, complexion, nourishment, life, sleep, good lusturous skin & strength. This should be done specially to head, ears & feet.

Contra indications for massage

वर्ज्योऽभ्यङ्गकफग्रस्तं कृत संशोध्यजीर्णिभिः ।। (अ.हृ. २/९)

Person suffering from *kapha* disorders, after purificatory measures & indigestion are unfit for *Abhyaṅga*.

केवलं सामदोषेषु न कथंचन प्रयोजयेत् । तरुणज्वर्यजीर्णि चनाभ्यक्तौ कथंचन ।।
तथा विरिक्तो वान्तश्च निरूढो यश्च मानवः। पूर्वयोः कृच्छता व्याधेरसाध्यत्वं अथापि वा ।।
शोषाणां तदहः प्रोक्ता अग्निमांद्यादयो गदाः । संतर्पण समुत्थानां रोगाणां नैव कारयेत्।।
(सु.चि.२४/३५-३७१)

Abhyaṅga is contra-indicated in *sāmāvasthā* of *doṣas*, beginning condition of fever, indigestion, after purgation (*virecana*), emesis (*vamana*), enema (*Niruha basti*) & diseases caused by over nourishment (*santarpaṇa*).

Foot massage (Pādābhyaṅga)

Benefits

खरत्वं स्तब्धता रौक्ष्यं श्रमः सुप्तिश्च पादयोः । सद्य एवोपशाम्यन्ति पादाभ्यङ्ग निषेवणात् ।।

जायते सौकुमार्यं च बलं स्थैर्यं च पादयोः । दृष्टि प्रसादः लभते मारुतश्चोपशाम्यति ।।
न च स्यात् गृध्रसीवातः पादयोः स्फुटनं न च ।
न सिरा स्नायु संकोचः पादाभ्यङ्गेन पादयोः ।। (च.सू. ५/९०-९१)

Pādābhyaṅga helps to remove dryness, stiffness, roughness, tiredness and numbness instantly. It also makes the skin smooth, provides strength & stability to feet, improves the vision & pacifies vāta. It also prevents diseases like sciatica (*Gṛdhrasi*), cracking of foot & stiffness of ligaments & tendons of foot.

Head massage (Śirobhyaṅga)

नित्यं स्नेहार्द्रशिरसः शिरश्शूलं न जायते । न खालित्यं न पालित्यं न केशाः प्रपतन्ति च ।।
बलं शिरः कपालानां विशेषेणाभिवर्धते । दृढमूलाश्च दीर्घाश्च कृष्णाः केशा भवन्ति च ।।
इन्द्रियाणि प्रसीदन्ति सुत्वग्भवति चाननम् । निद्रालाभः सुखं च स्यान्मूर्ध्नी तैलनिषेवणात् ।।
(च.सू.५/८१-८३)

Benefits

Daily practice of head massage prevents balding, greying, hairfall, gives strength to skull, strengthens hair root, makes the hair black & long. It also nourishes the sense organs, softens the skin, provides lusture to face. One gets good sleep after head massage.

Udvartana (उद्वर्तन)

Word *udvartana* is derived from *ud vrit Nic Bhave Karaṇeva lyut pratyaya,* which means *vilepana* applying, *gharṣaṇa* or hard massage.

Definition

उद्वर्तनं कफहरं मेदसः प्रविलयनम् । स्थिरीकरणमङ्गानां त्वक्प्रसादनकरं परम्।। (अ.हृ.२/१५)

Udvartana is a process which helps to decrease *kapha* and fat (*medas*), makes the body strong & gives excellent, clear and good complexion to the skin.

There are different opinions about *udvartana.* According to *caraka*

उद्वर्तनमभ्यङ्गपूर्वकम् उद्धर्षस्त्वनभ्यङ्गपूर्वकः ।। (च.पा. *on* च.सू. २३/१४)

Massage done after oil massage is Udvartana. Hard massage done without doing oil massage is *udgharṣaṇa.*

उद्वर्तनम् कषायादि चूर्णैः गात्रोद्घर्षणम् ।। (आ.र. *on* अ.हृ.सू. २/१५)

Udvartana is massage with different powders of herbs, having astringent taste.

According *to caraka* it cleans the body.

"शरीर परिमार्जनम्" उद्वर्तनम् ब्रूते ।। (च.पा. *on* च.सू.५/१३)

According to *suśruta*.

उघ्दर्षणम् अस्नेहौषधचूर्णादिभिर्घर्षणम् ।। (सु.चि. २४/४३)

Massage with powder of herbs without oil is *Udgharṣaṇa*.

सस्नेहकल्केनोद्घर्षणमुत्सादनम् ।। (डल्हण *on* सु.चि. २४/५३)

Massage with the paste of herbs along with oil is *Utsādana*.

Benefits

सिरामुख विविक्तत्वं त्वक्स्थस्याग्नेश्च तेजनम् । उद्घर्षणोत्सादनाभ्यां जायेयातामसंशयम्।।
उत्सादनात् भवेत् स्त्रीणां विशेषात् कान्तिमद्वपुः । प्रहर्षसौभाग्यमृजालाघवादिगुणान्वितम् ।।
(सु.चि.२४/५२-५३)

By *Udgharṣaṇa* blood vessels get dilated & *Agni* in skin (*Bhrājaka pitta*) gets enhanced.

Utsādana enhances complexion of ladies, gives pleasure, clearness & lightness in the body.

उघ्दर्षणं तु विज्ञेयं कण्डूकोठानिलापहम् । ऊर्वोः जनयत्याशु फेनकः स्थैर्यलाघवे ।।
कण्डू कोठानिलस्तम्भमलरोगापहश्च सः । तेजनं त्वग्गतस्याग्नेः सिरामुख विवेचनम् ।।
उद्घर्षणं त्विष्टिकया कण्डूकोठविनाशनम् ।। (सु.चि. २४/५४-५६)

Udgharṣaṇa cures itching, rashes, *vāta* diseases, enhances strength of thighs and provides lightness. It dilates the blood vessels, enhances *bhrājaka pitta*, cures itching & rashes.

Suśruta mentions one more type of massage known as *saṁvahana*.

संवहनम् सुखकर स्पर्श, मर्दनं तु गाढं पादाभ्यां आरंभ्य कटी पर्यन्तं । (सु.चि.२४/८३ड)

Saṁvahana is gentle touch, starting from foot to waist which produces pleasure.

Benefits of Saṁvahana

प्रीतिनिद्राकरं वृष्यकफवातश्रमापहम्। संवाहनं मांसरक्तत्वक्प्रसादकरं सुखम्।। (सु.चि.२४/८३)

Gentle massage enhances affection, sleep and virility, takes away kapha, tiredness & produces clearness of flesh (*māṁsa*), blood (Rakta) & skin. It also produces pleasure.

Mode of Action

Rubbing helps in absorption of effusion, relief of blood stasis and carrying away morbid products. Deep massage helps the interchange of tissue fluids by increasing the circulation in the superficial veins & lymphatics. The pressure helps the contents of the vessels towards the heart, if applied strongly & quietly, it has stimulating effect. It increases nutrition supply to all tissues. It relieves fatigue, influences the muscles by mechanical stimulation, caus-

ing them to contract. It increases circulation mainly in the veins, by alternate pressing & relaxation. It increases body temparature. It improves the condition of nervous system by stimulating cuteneous nerve endings.

Light rubbing on sides of spinal colomn for short period, stim ulates spinal nerves & in a reflex way strengthens the heart. It affects the vasomotor nerves & there by dilates blood vessels and also influences sensory nerves increasing their function.

Cutting of nails, hair etc (पाप्मोपशमनम्)

पाप्मोपशमनं केशनखरोमावमार्जनम् । हर्षलाघवसौभाग्यकरमुत्साहवर्धनम् ।। (सु.चि.२९/७३)

Cutting of hair, nails and body hair, enhance pleasure, lightness, luck & Enthusiasm.

Bath (स्नान)

स्नानंश्रमहराणां ।। (च.सू. २५/४०)

पवित्रं वृष्यमायुष्यं श्रमस्वेदमलापहम् । शरीरबलसन्धानं स्नानमोजस्करं परम् ।। (च.सू.५/९४)

Taking bath is auspicious, enhances virility, longevity, strength, compactness & ojas, at the same time cures tiredness, sweat & impurities of the body.

Benefits of taking bath

दौर्गन्ध्यं गौरवं तन्द्रां कण्डूं मलमरोचकम् । स्वेदबीभत्सतां हन्ति शरीर परिमार्जनम् ।।

(च.सू.५/९३)

After doing massage, if one takes bath, person will be cured of bad odour, heaviness of body, drowsiness, itching, impurities, distaste, sweat & unpleasentness due to sweat.

निद्रा दाह श्रमहरं स्वेदकण्डूतृषापहम् । तन्द्रा पापोपशमन तुष्टिदं पुंस्त्ववर्धनम् ।।
रक्तप्रसादनं चापि स्नानमग्नेश्च दीपनम् ।। (सु.चि. २४/५७-५८)

Bath takes away sleep, burning sensation, tiredness, sweat, itching, thirst & impurities. It is good for heart & purifying all organs, cures drowsiness, gives satisfaction, enhances virility, *agni* & clears the blood.

Effects of bath with hot & cold water

शीतेन पयसा स्नानं रक्तपित्तप्रशान्तिकृत् । अशिरस्कं तदुष्णेन बल्यं वातकफापहम् ।। (यो.र.)

Cold water bath cures bleeding disorder (*Rakta pitta*). Hot water bath excluding head enhances strength & destroys *kapha & vāta.*

उष्णेन शिरसः स्नानं अहितं चक्षुषः सदा । शीतेन शिरसः स्नानं चक्षुष्यमिति निर्दिशेत् ।।
श्लेष्ममारुत कोपे तु ज्ञात्वा व्याधि बलाबलम् । काममुष्णं शिरस्नानं भैषज्यार्थं समाचरेत् ।।

अतिशीताम्बु शीते च श्लेष्ममारुत कोपनम् । अत्युष्णामुष्णकाले च पित्तशोणितवर्धनम् ।।
(सु.चि. २४/५९-६१)

Taking head bath with hot water is injurious to eyes & cold water is good for eyes. During aggravation of *kapha* & *vāta* one can take head bath with hot water as medicine. Taking bath in very cold water during cold season leads to aggravation of *kapha* & *vāta*. In the same way taking bath with very hot water during summer leads to aggravation of *pitta* & *Rakta*.

Contraindications for bath

तच्चातिसारज्वरितकर्णशूलानिलार्तिषु । आध्मानारोचकाजीर्ण भुक्तवत्सु च गर्हितम्।।(सु.चि.२४/६२)

One should not take bath during diarrhoea, fever, ear aches, *vāta* disorders, flatulence, distaste, indigestion & immediately after taking food.

स्नानमार्दितनेत्रास्य रोगे ज्वर्य हि पीनसे ।।

Even conditions of facial paralysis, eye disease, fever, rhinitis are contraindications for bath.

Anointments (अनुलेपन)

सौभाग्यदं वर्णकरं प्रीत्योजोबलवर्धनम् । स्वेददौर्गन्ध्य वैवर्ण्य श्रमघ्नमनुलेपनम् ।।
(सु.चि.२४/६३)

Application of annointment gives luck, complexion and beautiful look. It enhances ojas and strength and removes sweat, bad smell, discolouration & tiredness.

Contra-indication for Annointments

स्नानं येषां निषिद्धं तु तेषामप्यनुलेपनम् ।। (सु.चि. २९/६९)

Conditions where bath is contraindicated, there annointments should also be avoided.

Protective measures (rakṣoghna)

रक्षोघ्नमथ चौजस्यं सौभाग्यकरमुत्तमम्। सुमनोऽम्बररत्नानां धारणं प्रीतिवर्धनम्।।
(सु.चि.२४/६५)

Wearing of flowers, beautiful cloth and gems increase the *ojas*, luck, beautiful look & love.

Washing of feet (पादप्रक्षालन)

पादप्रक्षालनं पादमलरोगश्रमापहम् । चक्षुः प्रसादनं वृष्य रक्षोघ्नं प्रीतिवर्धनम्।। (स.चि.२५/६९)

Washing the feet cleans the foot, cures diseases of feet and tiredness. It is good for eyes, enhances virility, kills the (bacteria?) *Rākṣasa* & enhances pleasentness.

Wearing cloth (वस्त्रधारण)

काम्यं यशस्यमायुष्यमलक्ष्मीघ्नं प्रहर्षणम्। श्रीमत्पारिषदं शस्तं निर्मलाम्बरधारणम्।। (च.सू.५/९५)

Wearing clean cloth enhances beauty, success, longevity, pleasentness of mind, recognition in the society & destroys poverty.

Wearing Garlands

वृष्यं सौगन्ध्यंमायुष्यं काम्यं पुष्टिबलप्रदम् । सौमनस्यं अलक्ष्मीघ्नं गन्धमाल्यनिषेवणम् ।।
(च.सू.५/९६)

Application of fragrent drugs like *candana, keśara, kastūri* etc & wearing of garlands, produce virility, fragrence, longevity, beauty, nourishment, strength, pleasentness of mind & destroys poverty.

Wearing of foot wear (पादत्रधारण)

चक्षुष्यं स्पर्शनहितं पादयोर्व्यसनापहम्। बल्यं पराक्रमसुखं वृष्यं पादत्रधारणम्।। (च.सू.५/१००)

Wearing foot wear is good for eyes, skin & destroys diseases of foot. It enhances strength, courage & virility.

Holding stick (दण्डधारण)

शुनः सरीसृपव्यालविषाणिभ्यो भयापहम् । श्रम स्खलन दोषघ्नं स्थविरे च प्रशस्यते ।।
सत्वोत्साह बलस्थैर्य धैर्य वीर्य विवर्धनम् । अवष्टम्भकरं चापि भयघ्नं दण्डधारणम् ।।
(सु.चि.२९/७६-७७)

Holding a stick helps to ward off fear of dog, reptiles, tiger etc cruel animals & animals with horns. In the condition of tiredness & old age helps to walk. It enhances qualities of *satva*, enthusiasm, strength, courage, stability & power. It gives support & destroys fear.

Wearing of protective covering (कवच धारण)

बाणवारं मृजावर्णतेजोबल विवर्धनम् ।। (सु.चि. २४/७९)

Wearing protective covering enhances clearness, complexion, lusture & strength.

Wearing Head turban & Umbrella

पवित्रं केश्यमुष्णीवं वातातपरजोऽपहम् । वर्षानिलरजोघर्महिमादीनां निवारणम् ।।
वर्ण्यं चक्षुष्यमोजस्यं शंकर छत्रधारणम् ।। (सु.चि. २४/७५)

Wearing turban over the head, helps to keep the hair clean and good for hair. Umbrella protects from rain, wind, dust, fumes, mist & intense heat of sun. It improves complexion and good for eyes & enhances *ojas* & is auspicious.

Chapter- 2

NIGHT REGIMEN

The regimen that is followed since evening hours to night is included under *rātricarya*, which should be adopted for maintenance of health & prevention of diseases.

Actions contraindicated during evening time

एतानि पञ्चकर्माणि सन्ध्यायाम् वर्जयेत् बुधः । आहारं मैथुनं निद्रां सम्पाठं गतिमध्वनि ।।
भोजनाज्जायते व्याधिर्मैथुनाद्गर्भविकृतिः । निद्रया निःस्वता पाठादायुर्हानिर्गतिर्भयम् ।।
(भा.प्र. प्रथम ५/२६१-२६२)

In take of food, sexual intercourse, sleep, reading & walking these five actions are contraindicated in evening hours. In take of food produces diseases, sexual act leads to deformity in the foetus, sleep produces poverty, reading leads to loss of life span & long walk leads to fear.

प्रदोष पश्चिमौ यामौ वेदाभ्यासेन तौ नयेत् । प्रहर द्वयम् शयने ब्रह्मभूयाय कल्पते ।। (दक्षस्मृति)

The hours before night and last two *prahara* (6 hrs) of night should be utilized by studying & remaining two *praharās* should be given to sleep. Who performs these activities daily will be endowed with good physical & mental health.

Effect of moon light on the body

ज्योत्स्ना शीता स्मरानन्दप्रदा तृट्पित्तदाहहृत् । ततो हीन गुणः कुर्यादवश्यायोऽनिलं कफम् ।।
तमो भयावहं मोहदिमोहजनकं स्यात् । पित्तहृत् कफ हृत्कामवर्धनं क्लमकृच्च तत् ।।
(भा.प्र. प्रथम ५/२६२-२६९)

Moon light is having cold soothing effect over the body. It enhances sexual desire, pacifies thirst, pitta & burning sensation in cardiac region. Mist at night time is inferior in quality, leads to aggravation of *vāta & kapha*. Darkness produces fear, delusion, confusion in recognition of directions, alleviates *pitta & kapha* & enhances sexual desires & causes tiredness.

Supper

रात्रौ च भोजनं कुर्यात् प्रथमप्रहरान्तरे।किञ्चिदूनं समश्नीयात् दुर्जरं तत्र वर्जयेत्।।(भा.प्र.प्रथम५/२७९)

Meal should be consumed in the first *prahara* (3 hrs) of night, food is taken in lesser quantity than afternoon & avoid the food that is difficult to digest.

सायं भुक्त्वा लघु हितं समाहितमनाः शुचिः। शास्तारमनुसंस्मृत्य स्वचर्यां चाथ संविशेत् ।।
(अ.सं.सू.३/११८)

After taking light & conducive food in the evening, person should go to sleep with pleasent mind, after offering prayers to god in his own bed.

Activities after meals (Bhojanottara karma)

ततः पाणिगतमन्नमन्येनापनीय दन्तातरस्यं च शनैः शनैः शोधनेन विशोध्य लेपगन्ध स्नेहापनोदमाचान्तोङ्गुल्यग्रगलिताम्बु परिषित्कनेत्रस्ताम्बूलादिकृत वदनवैशद्यो धूमपानादिहृतोर्ध्व कफवेगः पदशतं मात्रं गत्वा वामपार्श्वेन संविशेत् । द्रवोत्तर भोजनस्तु शय्यां नातिसेवेत ।। (अ.सं.सू. १०/१३)

After taking meals, one should clear his hands properly by removing food completely, clear the teeth by using tooth picks, if there is coating and bad odour gargle the mouth properly, touch the eyes with moist finger tips, clear the mouth by chewing betel leaves, inhale smoke to remove *kapha* in upper part, later walk for about hundred steps & sleep on left lateral position. After intake of more of liquid food sleep duration should be for less time.

Strengthening of eyes

त्रिफलां मधुसर्पिर्भ्यां निशिनेत्र बलाय च । स्वास्थ्यानुवृत्तिकृद्यच्च रोगोच्छेदकरं च यत् ।।
(अ.सं.सू.१०/२०)

Terminalia chebula, Terminalia belerica & Emblica officinalis, ie *Triphala*, mixed with honey & ghee should be used at night to strengthen the vision. All foods which are good for body & help to maintain health & cure the diseases should be used daily.

भुक्त्वा राजावदासीत यावदन्नफलभोगतः । ततः पादशतं गत्वा वामपार्श्वेन संविशेत् ।।
(सु.सु.४६/४८७)

After meals, one should sit comfortably like a king till the stress of food is over, then one should walk hundred steps & should lie down on bed by left side.

Collyrium

सौवीरमञ्जनम् नित्यं हितमक्ष्णोः प्रयोजयेत्। पञ्चरात्रेऽष्टरात्रे वा स्रावणार्थे रसाञ्जनम्।।(च.सू.५/१५)

Sauvīrāñjana should be used daily, as it is conducive for eyes. But once in 5 or 8 days *Rasāñjana* should be applied to purify the *doṣas* of eyes.

Smoking

One can practice smoking after intake of food at night to alleviate excess of *kapha*.

Sleep

निद्रा हि नाम प्राणीनाम् प्रथममिदम् शरीरधारणनिमित्तम् । (चन्द्रकौशीक)

Nidra is prime among the factors responsible for sustenance of the body.

अर्धरोगहरी निद्रा ।

Sleep destroys half the diseases.

ये स्वपति सुखं रात्रौ तेषां कायाग्निरिच्यते। आहारम् प्रतिगृह्णाति ततः पुष्टिकरं परम्। ।(स्कन्ध पुराण)

One who gets sound sleep at night, can digest the food well, his *kāyāgni* is enhanced & there is proper nourishment of the body.

Sexual intercourse (मैथुन)

शरीरे जायते नित्यं देहिनः सुरतस्पृहा।अव्यवायान्मेहमेदोवृद्धिः शिथिलता तनोः। ।(भा.प्र.प्रथम ५/२६६)

Man will have desire for sexual intercourse daily, on supression of this urge, he may suffer from diabetes, obesity & looseness of the body.

बालेती शीयते नारी यावद्वर्षाणि षोडश । ततस्तु तरुणी ज्ञेया द्वात्रिंशत्वत्सरावधि। ।(भा.प्र.५/२८१)

A woman upto sixteen years is considered as child, after that upto 32 years she is considered as youth ie taruṇi, after that upto 50 years she is considered as *prouḍha or adhirūḍha,* after that she is considered as old or *vṛddha*. The sexual intercourse is contra-indicated in old age as she is not inclined towards sex.

निदाघशरदोर्बाला हिता विषयिणां मता । तरुणी शीतसमये प्रौढा वर्षावसन्तयोः ।।
नित्यं बालासेव्यमाना नित्यं वर्धते बलम् । तरुणी ह्रासयेच्छक्तिं प्रौढाभ्दावयते जराम् ।।
(भा.प्र. १५/२६९-२७०)

The person having desire for sex opine that young girl (*bālā*) is ideal during summer & autumn, youth during winter & middle aged woman during rainy & spring season. Sexual intercourse with young girl daily increases strength, sex with taruṇi daily reduces strength & sex with middle aged lady daily leads to onset of old age.

Methods to enhance strength instantaneously

सद्यो मांसं नवं चान्नं बालास्त्री क्षीरभोजनम् । घृतमुष्णोदके स्नानं सद्यः प्राणकराणि षट् ।।
(भा.प्र.प्रथम५/२७१)

Fresh meat, new rice, young girl, food along with milk, ghee & bath with warm water enhance the strength instantaneously.

Factors which reduce strength instantaneously

पूतिमांसं स्त्रियोवृद्धा बालाऽर्कस्तरुणं दधि । प्रभाते मैथुनं निद्रा सद्यः प्राणहराणि षट् ।।
(भा.प्र.१/५/२७२)

Bad smelling meat, old aged lady, sun light during *Kanyā rāśi*, freshly formed curds, sex during morning & sleeping are six factors which reduce prāṇa immediatety.

वृद्धोऽपि तरुणीं गत्वा तरुणत्वमवाप्नुयात् । वयोधिकां स्त्रियं गत्वा तरुणः स्थविरायते ।।
(भा.प्र.१/५/२७३)

Sexual indulgence of old man with young girl makes him younger, while sex of young man with older lady makes him as old man.

Beneficial effects of sexual intercourse

आयुष्मन्तो मन्दजरावपुवर्णबलान्विताः। स्थिरोपचित मांसश्च भवन्ति स्त्रीषु संयुताः।।(भा.प्र.१५/२७४)

The person who follows rules & regulations with respect to sexual intercourse will be endowed with delayed ageing, good complexion, strength, firm & strong musculature.

Practice of sexual intercourse according to seasons

सेवेत क्रमतः कामं बलाद्वाजीकृतौ हिमे। प्रकामं तु निषेवेत मैथुनं शिशिरागमे।।(भा.प्र.१५/२७५)

Person should take drugs enhancing virility & practice sexual intercouse in *Hemanta ṛtu*. During *śiśira ṛtu* without using aphrodiasac one can do sexual intercourse according to his will.

त्र्यहाद्वसन्तशरदो पक्षाद् वृष्टिनिदाघयोः। सेवेत कामतः कामः हेमन्ते शिशिरे बली।।(अ.स.सू.९/७५)

During *Vasanta & śarad ṛtu*, it should be done once in 3 days, in *varṣa & grīṣma ṛtu* it should be done once in 15 days. During *hemanta & śiśira ṛtu* one should do according to his desire.

According to the opinion of *Suśruta*, one should practice sexual intercource once in 3 days in all seasons except *grīṣma,* when it will be once in 15 days.

Time for sexual intercourse

शीते रात्रौ दिवा ग्रीष्मे वसन्ते तु दिवा निशि। वर्षासु वारिदध्वाने शत्सु सरसः स्मरः।।(भा.प्र. ५/२७८)

During cold seasons at night, in summer at day time, in spring day or night, in rainy season when thunder bolts are heard, one should practice sexual intercourse, when there is sexual urge.

Times not suitable for sexual intercourse

उपेयात्पुरूषो नारी सन्ध्यायोर्न च पर्वसु। गोसर्गे चार्द्धरात्रे च तथा मध्यदिनोपि च।।(भा.प्र.५/२७९)

One should not indulge in sexual intercourse in evenings, fullmoon & new moon days, time when cows are released from hut for grazing, midnight & mid day.

Place for sexual intercourse

विहारं भार्यया कुर्यात् देशोतिशयसंवृते। रम्ये श्राव्याङ्गनागाने सुगन्धे सुखमारुते।।(भा.प्र.५/२८०)
देशे गुरुजनासन्ने विवृतेऽतित्रपाकरे । श्रूयमाणे व्यथाहेतुवचने न रमेत ना ।। (भा.प्र.५/२८१)

One should indulge in sexual intercourse with his wife in private secrete place which is beautiful, sweet smelling, where melodius music is heard & pleasent wind is blowing in. But the place should not be near the residence of teachers, too open which may cause shyness & allows sound of discomfort to exterior.

Preparations prior to sexual intercourse

स्नातचन्दनलिप्ताङ्गः सुगन्ध सुमनोऽन्वितः । भुक्तवृष्यः सुवसनः सुवेषः स मलंकृतः ।।
ताम्बूलवदनः पत्न्यामनुरक्तोऽधिकस्मरः। पुत्रार्थी पुरुषो नारीमुपेयच्छयने शुभे।।(भा.प्र.५/२८२-२८३)

The man desirous of having son should take bath, apply paste of sandal wood for sweet smell, take aphrodiasac, wear good cloth & good appearance, after chewing betel leaves, having love towards his wife should go to beantiful bed with pleasent mind & indulge in sexual intercourse.

Male unifit for sexual intercourse

अत्याशितोऽधृति क्षुद्वान्सव्यथिताङ्गः पिपासितः । बालो वृद्धोऽन्यवेगार्तस्त्यजेद्रोगी च मैथुनम् ।।
(भा.प्र.५/२८४)

Those who have taken large quantity of food, having weak mind, suffering from hunger, body ache, thirst, young boy or elderly & during natural urges should not indulge in sexual intercourse.

Ideal female for sexual intercourse

भार्या रूपगुणोपेतां तुल्यशीलां कुलोभ्द्वाम् । अतिकामोऽभिकामां तु दृष्टो दृष्टामलंकृताम् ।।
सेवेत प्रमदां युक्त्या वाजीकरणबृंहितः ।। (भा.प्र.५/२८५)

After consuming aphrodiasac, one should indulge in sexual intercourse with beautiful wife endowed with good qualities & characters, born in good family, who is interested in sex, having pleasent mind & well decorated.

Lady unfit for sexual intercourse

रजस्वलामकामां च मलिनामप्रियां तथा । वर्णवृद्धां वयोवृद्धां तथा व्याधिप्रपीडिताम् ।।
हीनाङ्गी गर्भिणीं द्वेष्यां योनिरोगसमन्विताम् । सगोत्रां गुरुपत्नीं च तथा प्रव्रजितामपि ।।
नाधिगच्छेत् पुमान्नारीं भूरिवैगुण्य शङ्कया ।। (भा.प्र. ५/२८६-२८८)

Lady who is menstruating, not inclined towards sex, dressed with dirty cloths, not dear to mind, belonging to higher caste, elder to man, suffering from disease, with defective organs, pregnant, who has hatred towards the man, suffering from gynaecological

disorders, born in same gotra, wife of teacher & lady who has accepted saint hood ie (*sanyāsi*) is not fit for having sex, if one indulges in sexual intercourse with such lady it will lead to harmful effects.

	Sexual intercourse with	**Harmful effects**
1.	Menstruating lady	Vision defects, lifespan decreases, loss of lusture
2.	Saint (**sanyāsi**) wife of teacher, belonging to same lineage (**gotra**), elderly lady, during fulmoon day or new moon day Pregnant lady	Life span will be reduced. Cause discomfort to foetus
3.	Lady suffering from disease	Loss of strength.
4.	Defective organs, wearing dirty cloths, hatred towards men, weak & infertile lady.	Potency will be reduced, Depression may occur
5.	If one indulges in sexual intercourse during hunger, with disturbed mind, in aftermoon, when thristy, one is weak.	Leads to aggravation of **vāyu** & depletion of **śukra**
6.	Sexual intercourse in diseased condition or during morning time or at midnight	Leads to body ache, splenomegaly, unconsciousness death & aggravation of **vāta** & **pitta**.
7.	Sexual indulgence in other routes (**Tiryak yoni**) like other animals, anal, vātādi vitiated yoni	Leads to upadaṁśa, aggravation of vāyu, depletion of śukra.
8.	Sexual indulgence during urge of micturation.	**śukrāśmari**

Practices beneficial after sexual intercourse

स्नानं सशर्करं क्षीरं भक्ष्यमैक्षवसंस्कृतम्। वातो मांसरस स्वप्न सुरतान्तो हिता अमि।।(भा.प्र.५/२९८)

One should take bath and take milk with sugar, food preparations made of sugar cane juice, cool wind, meat soup & then go to sleep.

Combination for inducing good sleep

यो लेढी शयनसमये मधुमिश्रं बीजपूरदलचूर्णम्। स तु लज्जाकरवात प्रसरनिशेचात् सुखं स्वपति।।
(भा.प्र.५/३०२)

One should lick the powder of leaves of *bījapūra* with honey, by this the *vāta* in down ward direction (*Apānavāyu*) is pacified & person gets good sleep.

Chapter- 3

SEASONAL REGIMEN

Seasonal regimen (ऋतु चर्या)

तस्याशिताद्यादाहाराब्दलं वर्णश्च वर्धते। तस्यार्तुसात्म्यं वदितं चेष्टाहारव्यपाश्रयम्।।(च.सू.६/३)

The strength and lusture of the person knowing the suitable diet and regimen for every season and practicing accordingly are enhanced.

Definition (निरूक्ति)

ऋतु काल पर्यायः। चर्या चरणं वर्तनं। चर्या शास्त्र नियमित आचारः।।(डल्हण *on* सु.चि.३/८)

Ṛtu is Synonym of time and *caryā* is regimen to be followed.

उभयलोक हितमाहारविहार चेष्टितमिति यावत् । (अ.हृ.सू. ३/१)

The regimen which is wholesome to every one with respect to diet and practices is *ṛtu caryā*.

ऋतुचर्या हि शीतोष्ण वृष्टिदोषप्रतिक्रिया ।। (अ.सं.सू. ९)

The changes in diet and practices in response to change in climatic conditions like heat, cold, rain etc is *Ṛtu Caryā*.

Classification (भेद)

The year is divided into six *Ṛtus* or seasons depending on changes in the climate.

मासैर्द्विसंख्यैर्माघाद्यैः क्रमात् षड् ऋतवः स्मृताः। शिशिरोऽथवसन्तश्च ग्रीष्मवर्षाशरद्धिमाः।।(अ.हृ.३/१)

Name of Ṛtu	*Rāśi of sun*	*Śaka varṣa*	*Month*	*Predomi-aent Rasa*
1. *Śiśira* (Late winter)	*Makaram* *Kumbham*	*Māgha/ Tapa* *Phalguṇa/ Tapasya*	Jan 15- Feb 15 Feb 15- March 15	*Tikta*
2. *Vasanta* (Spring)	*Mīnam* *Meṣa*	*Caitra/ Madhu* *Vaiśākha/ Mādhava*	March 15- April 15 April 15- May 15	*Kaṣāya*
3. *Grīṣma*	*Vṛṣabha*	*Jyeṣṭha/ Śuci*	May 15- June 15	*Kaṭu*

Name of Ṛtu	*Rāśi of sun*	*Śaka varṣa*	*Month*	*Predomi-aent Rasa*
(Summer)	*Mithuna*	*Aṣāḍha/ Śukra*	June 15- July 15	
4. *Varṣā* (Rainy)	*Karkaṭaka* *Siṁha*	*Śrāvaṇa/ Nabha* *Bhādrapada/ Nabhasya*	July 15- Aug 15 Aug 15- Sept 15	*Amla*
5. *Śarat*	*Kanyā* *Tula*	*Āśvīja/ Īśa* *Kārtika/ ūrja*	Sept 15- Oct 15 Oct 15- Nov 15	*Lavaṇa*
6. *Hemanta* (Winter)	*Vṛścika* *Dhanu*	*Margaśira/ Saha* *Puśya/ Sahasya*	Nov 15- Dec 15 Dec 15- Jan 15	*Madhura*

These six seasons are broadly divided into two *Ayanās* or solistices, depending on the direction of movement of sun that is *Uttarāyaṇa and Dakṣiṇāyana.*

Uttarāyaṇa/Ādāna Kāla (Northern solistice)

It indicates the ascent of sun or northward movement of sun.

Definition (निरुक्ति)

उत्तरां दिशां प्रति अयनं गमनम् इति उत्तरायणं ।। (अ.हृ. ३/२ स.सु. टीका)

The movement of the sun in northern direction is *uttarāyaṇa.*

आददाति क्षपयति पृथिव्याः सौम्यांशं प्राणिनां बलमित्यादानम् ।।

The *ayana* reduces the saumya or mild qualities from the earth and takes away the strength of human beings.

शिशिराद्यैस्त्रिभिस्तैस्तु विद्यादयनमुत्तरम् । आदानं च तदादत्ते नृणां प्रतिदिनं बलं।। (अ.हृ.३/२)

Śiśira, Vasanta & Grīṣma ṛtu together form *Uttarāyaṇa* which bring about reduction of strength.

Cause for decrease of strength during Ādāna Kāla

तस्मिन् ह्यत्यर्थ तीक्ष्णोष्ण रूपा मार्गस्वभवतः। आदित्य पवनाः सौम्यान् क्षपयन्ति गुणान् भुवः।। तिक्त कषाय कटुको बलिनोत्र रसाः क्रमात् तस्मादादानं आग्नेयं ।। (अ.हृ. ३/३)

The intensity of sun is more and the wind is dry, which reduce the mild properties of the earth. *Titka, Kaṣāya* and *kaṭu rasas* respectively are predominant in this season.

Effect of Ādānakāla on the body

तत्र रविर्भाभिरादानो जगतः स्नेहं वायवस्तीव्र रूक्षाश्चोपशोषयन्तः शिशिर वसन्त ग्रीष्मेषु यथा क्रमं रौक्ष्यमुत्पादयन्तो रूक्षान् रसांस्तिक्त कषायकटुकांश्चाभिवर्धन्ते नृणां दौर्बल्यमावहन्ति ।।
(च.सू. ६/६)

During the period of *Ādānakāla*, not only sun rays but the wind have sharp velocity and dryness absorb the moisture from the earth, the three seasons have increased *Tikta, kaṣāya* and *kaṭu rasa* respectively, which bring about dryness in the body and reduce the bala.

आददानं उच्छोषयन् ।। (आ.र.)

Fast, dry winds and intense heat of sun dries the body.

Relation between season, strength & predominant tastes

Ṛtu	*Raukṣya*	*Rasa*	*Pañcabhūta*	*Bala Hrāsa*
Śiśira	*Alpa*	*Tikta*	*Ākāśa*	*Alpa*
Vasanta	*Madhya*	*Kaṣāya*	*Pṛthvi, vāyu*	*Madhya*
Grīṣma	*Pravara*	*Kaṭu*	*Agni, vāyu*	*Mahā*

If we analyse the dryness in environment and *Rasa, Kaṣāya rasa* is more dry compared to *kaṭu rasa. Grīṣma ṛtu* is more dry than *vasanta ṛtu*. But consideration of predominance of taste, *vasanta ṛtu* is predominant in *kaṣāya rasa* & *Grīṣma ṛtu* is predominant in *kaṭu rasa*. Here we infer that *Vasanta* is *kapha prakopa kala*, so dryness brought about by *Kaṣāya rasa* is pacified by *kapha*, thus making it *madhya Rūkṣa*.

Dakṣiṇāyana/Visargakāla (Southern solistice)

It indicates the descent of sun or movement of sun in southern direction.

दक्षिणां दिशं प्रति गमनं दक्षिणायनम् ।। (अ.हृ. ३/४ स.सु. टीका)

The southward movement of sun and the *ayana* which gives strength.

विसृजति जनयति आप्यमंश प्राणिनां बलमिति विसर्गः । यब्दलं विसृजत्ययम् ।। (अ.हृ.३/४)

The *ayana* which enhances *Ap* principles and strength of the beings is *visargakāla*.

Seasons in Dakṣiṇāyana

ऋतवो दक्षिणायनम् वर्षादयो विसर्गश्च ।। (अ.हृ. ३/९)

Ṛtus in *Dakṣiṇāyana* are *Varṣā*, *Śarat* and *Hemanta*.

Effects of Dakṣiṇāyana on the body–

सौम्यत्वादत्रसोमो हि बलवान् हीयते रविः मेघवृष्ट्यनिलैः शीतैः शान्ततापे महीतले ।।
स्निग्धाश्चेहाम्ललवणमधुरा बलिनो रसाः ।। (अ.हृ. ३/५-६)
शीतेग्र्यं वृष्टिघर्मेऽल्पं बलं मध्यं तु शेषयोः ।।

The winds are not very dry and fierce, moon is more powerful than sun, the heat of the earth is taken away by clouds, rain and cold wind. Unctousness sets in the atmosphere and sour, salt and sweet tastes are predominant, so the strength of person enhances during this period.

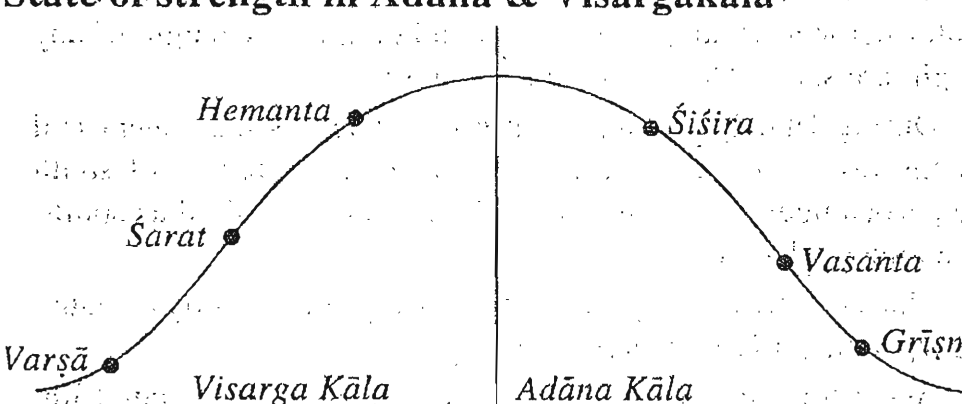
Relation between season, strength and predominant taste

Ṛtu	*Rasa*	*Pañcabhūta*	*Bala*
Varṣā	*Amla*	*Pṛthvi, Agni*	*Alpa*
Śarat	*Lavaṇa*	*Āp, Agni*	*Madhyama*
Hemanta	*Madhura*	*Pṛthvi, Āp*	*Uttama*

आदावन्ते च दौर्बल्यं विसर्गादानयोर्नृणां। मध्ये मध्य बलं त्वत्ते श्रेष्ठमग्रे च निर्दिशेत्।।(च.सू.६/८)

In the beginning of *Visargakāla* and ending of *Ādāna kāla* weakness occurs in the beings. In the middle moderate strength and in the end of *visarga kāla* maximum strength is seen.

State of strength in Ādāna & Visargakāla



Causation of Seasons

Causation of seasons is the function of Vāta according to *Vātakalākalīya Adhyāya*.

सृष्टिश्च मेघानां अपां विसर्गः औद्भेदनं चाद्भिदानां पुष्पं फलानां च अभिनिर्वर्तनं, बीजाभिसंस्कारः सस्वाभिवर्धनं अविक्लेदोपशोषणं, ऋतुनां प्रविभागः ।। (च.सू. १२/६)

Creation of clouds, raining, springs from earth, flowering, fruiting, seeding, growth, drying and division of *ṛtu* all are by the motivation of *vāta*.

शीतांशु क्लेदयत्युर्वीं विवस्वन् शोषयत्यपि। तावुभावपि संश्रित्य वायुः पालयति प्रजाः।।(सु.सु. ६/८)

Moon by the soothening rays makes the universe moist and sun dries it up with his scorching rays. *Vāyu* with the help of sun and the moon maintain, the climate of the universe.

Modern

The movement of the earth is responsible for occurence of the seasons. Earth exhibits three kinds of movements.

1. Rotation 2. Revolution 3. Precision.

The movement of the earth around its own axis is responsible for occurance of day and night. Along with rotation the earth revolves around the sun in certain path called as orbit in the space. The path is elliptical and responsible for occurence of seasons. Along with the above two movements earth ratates around itself with an axis of 30^0. This changes gradually by 11,000 years, at that time there will be change in seasons.

During **Uttarāyaṇa** the rays of the sun fall perpendicularly at 30^0 meridion of north pole on june 21st of every year. It is called northern summer solistice.

Then gradually earth moves and the rays of the sun fall on the equator perpendicularly on sept 21st and on this day length of day & night are same. This is called as equinox.

During **Dakṣiṇāyana** the earth continues its movement and now the rays of the sun directly fall over 30^0 meredion of south pole perpendicularly on December 21st. And it is called as southern summer solistice.

The movement continues and the sun rays fall directly on equator perpendicularly on march 21st and is called equinox.

According to our classics *uttarāyaṇa* starts from Jan 15th, which can be related to the falling of sun rays perpendicularly, the movement start from south towards north which has been described as उत्तरं दिशां प्रति गमन or उत्तरायण similarly *Dakṣiṇāyana*.

Representation of seasons in a day–

तत्र पूर्वान्हे वसन्तस्य लिङ्गं, मध्यान्हे ग्रीष्मस्य, अपरान्हे प्रावृषः प्रदोषे वार्षिकं शारदमर्धरात्रे प्रत्युषसि हैमन्तमुपलक्षयेत् । एवमहोरात्रमपि वर्षमिव शीतोष्ण वर्षालक्षणं दोषोपचयप्रकोप शमैर्जानीयात् ।। (सु.सू. ६/३७)

Characters of different seasons have been exhibited in different times of the day. In the morning features of *Vasanta ṛtu*, afternoon *Grīṣma*, mid day *Prāvṛt*, evening *Vasanta*, mid night *śarat* and early morning *Hemanta* will be seen along with *doṣa* vitiation accordingly.

Difference of opinion regarding different seasons–

Caraka	*Suśruta*
Vasanta	*Vasanta*
Grīṣma	*Grīṣma*
Varṣā	*Prāvṛt*
Śarat	*Varṣā*
Hemanta	*Śarat*
Śiśira	*Hemanta*

Dalhaṇa gives the following explanation for this difference in seasons.

गङ्गायां दक्षिणे कूले वर्षा बहु भवति तेन तत्र प्रवृडादि क्रमः, गङ्गोत्तर कूले शीतं बहु भवति तेन तत्र हेमन्त शिशिरौ भवतः ।। (डल्हण)

In southern parts of *Gaṅgā* rain is more, so *prāvṛt* and *varṣa ṛtu* is explained excluding *śiśira,* as there is no extreme cold. Northern parts of *Gaṅgā* cold is extreme, so *Hemanta* and *Śiśira* are included excluding *prāvṛt.*

Basic rules of seasonal regimen

शीते वर्षासु चाद्यास्त्रीन् वसन्तेऽन्त्यान् रसान् भजेत् ।
स्वादुं निदाघे, शरदि स्वादु तिक्तकषायकान् । शरद्वसन्तयोः रूक्षं शीतं घर्म घनान्तयोः ।।
अन्नपानं समासेन विपरीतमतोऽन्यदा ।। (अ.हृ.सू. ३/५६)

During *hemanta, Śiśira* and *Varṣā ṛtu* sweet, sour & salt tastes respectively should be consumed. During *Grīṣma* sweet taste, *śarat* sweet, bitter & astringent tastes should be consumed. In *Śarat* and *vasanta* dry and cold foods and in *Śiśara* and *Hemanta* unctous and hot food should be used.

Hemanta Ṛtu

Features of Ṛtu

वायुर्वात्युत्तरः शीतोरजोधूमाकुला दिशाः छन्नस्तुषारैः हिमानद्धा जलाशयाः ।।

दर्पिता ध्वांखक्षगाव्हमहिषोरभ्र कुञ्जराः। रोध्र प्रियङ्गु पुन्नागाः पुष्पिता हिमसाव्हये।।(सु.सू.६/२२-२३)

The cold wind in the northern direction with dust and smoke all around is present in *Hemanta ṛtu*. The sun is covered with mist, lakes, tanks etc are covered with ice, the birds like crow, animals like rhinoserous, bufellos, horse and monkey get wild, as it is the season for mating. This is the season for flowering of *lodhra*, *priyaṅgu* and *Nāgakesara*.

Effects on the body

शीते शीतानिलस्पर्शसंरुद्धो बलिनां बली । पक्ता भवति हेमन्ते मात्राद्रव्यगुरुक्षमः ।।
स यदा नेन्धनं युक्तं लभते देहजं तदा । रसं हिनस्त्यतो वायुः शीतः शीते प्रकुप्यति ।।

Agni– During *hemanta ṛtu* due to the atmospheric cold the heat of the body is conserved inside by constriction. This leads to the increase of *Jaṭharāgni*. So if proper heavy food is not consumed, it will burn away the *rasādi dhātus*, as the food in the form of fuel is not available.

Concept of ṛtu sandhi

ऋत्वोरन्त्यादिसप्ताहावृतुसन्धिरिति स्मृतः । तत्र पूर्वो विधिस्त्याज्यः सेवनीयोऽपरः क्रमात् ।।
क्रमात् पादेन अभ्यसेत् । (अ.हृ.सू.३/५८)

Last week of preceeding *ṛtu* & first week of the *ṛtu* together is known as *ṛtu sandhi*. *Caryās* or regimens of *ṛtu* should be discontinued gradually ie *pādaṁśa abhyāsa* & regimens of coming ṛtu should be gradually adopted. Sudden change in the regimes may produce diseases of *asātmya* (incompetence).

Doṣa

हेमन्ते निचितः श्लेष्मा ।

Hemanta is the season when accumulation of *kapha* and pacification of *pitta* occurs.

ता एवौषधयः कालपरिणामात् परिणत वीर्या बलवत्यो हेमन्ते भवन्त्यापश्च प्रशान्ताः स्निग्धा अत्यर्थं गुर्व्यश्च ता उपयुज्यमानामन्दकिरणत्वाभ्दानोः सतुषार पवनोपस्तम्भी तदेहानां देहीनां अविदग्धाः स्नेहाच्छैत्याद्गौरवादुपलेपाच्च श्लेष्मसंचयमापादयन्ति।।(सु.सू. ६/११)

The medicines have good potency due to effect of time. The water is clean, unctous & heavy, sun rays are mild due to ice and mist in the atmosphere. The water and medicines have sweet *vipāka*, unctous, cold and heavy qualities. So produce accumulation of *kapha* in *Hemanta*.

Diet

औदकानूपमांसमेद्यानां उपयोजयेत् । बिलेशयानां मांसानि प्रसहानां भृतानि च ।।

भक्षयेन्मधुरां शीधुं मधुचानुपिबेन्नरः । गोरसानिक्षुविकृती वसां तैलं नवौदनम् ।।
हेमन्तभ्यस्यतस्तोयमुष्णं चायुर्न हीयते ।। (च.सू.६/११-१३)

The flesh of water animals, cornivores and animals residing in burrows should be consumed during cold seasons along with sweet, sīdhu (variety of fermented preparation) & honey. One should drink milk, juice of sugarcane and its products.

According to *Vāgbhaṭa* due to long night, person feels hungry in the morning itself, so after daily regimen one should take sweet, sour, salt and unctous food items.

Other Regimens

वातघ्न तैलैरभ्यङ्ग मूर्ध्नी तैलं विमर्धनं । नियुद्ध कुशलैः सार्धम् पादाघातं च युक्तितः ।।
कषायापहृत स्नेहस्ततः स्नातो यथाविधि। कुङ्कुमेन सदर्पेण प्रदिग्धोऽगुरु धूपितः।।(अ.हृ.३/११-१२)
प्रवाराऽऽजिन कौशेय प्रवेणी कौथवाऽऽस्तृतम् । उष्णास्वभावैर्लघुभिः प्रावृतः शयनं भजेत् ।।
युक्त्यार्क किरणान् स्वेदं पादत्राणं च सर्वदा। पीवरोरुस्तनश्रोण्यः समदाः प्रमदाः प्रियाः।।
हरन्ति शीतमुष्णाङ्ग्यो धूपकुंकुमयौवनैः । अङ्गरतापसन्तप्त गर्भभूवेष्म चारिणः ।।
शीत पारुष्य जनितो न दोषो जातु जायते ।। (अ.हृ.३/१३-१६)

One should undergo body and head massage, do fighting with experts in wrestling, sit ups, one should remove unctousness by drugs having astrigent taste like *āmalaki* powder and then take bath in hot water. After drying the body *Kuṁkuma, Kastūri* should be applied and fumigated with *Agaru*. One should use heavy clothing like rugs, silk, dear's skin etc in bed. one should use light but warm cloth for covering.

One should expose for morning rays of sun and can do any other type of *sveda*. Always he should wear chappals. One should embrace a healthy woman with well developed breast, with her body smeared with *agaru*, which removes coldness. One should reside in the rooms made hot by heating or underground houses which can never be affected with the *doṣas* due to excessive cold.

Śiśira Ṛtu (शिशिर ऋतु)

Features of Śiśira ṛtu

शिशिरे शीतमधिकं वातवृष्ट्याकुलाः दिशः। शेषं हेमन्तवत् सर्वं विज्ञेयं लक्षणं बुधैः।।(सु.सू.६/२९)

The season is more cold and rains are present along with cold wind. Other characters are similar to that of *Hemanta ṛtu*.

Regimen

अयमेव विधिः कार्यः शिशिरेऽपि विशेषतः । तदाहि शीतमधिकं रौक्ष्यं चादान कालजं ।।
(अ.हृ.सू.३/१७)

The regimen is same as that of Hemanta ṛtu, as it is the beginning of *Ādāna kāla* dryness and loss of strength increases gradually.

Vasanta ṛtu

Features of Vasanta ṛtu

वसन्ते दक्षिणोऽनिलः । दिशो वसन्ते विमलाः काननैरुपशोभिताः ।।
किंशुकांभोजवकुलच्यूताशोकादि पुष्पितैः । कोकिलाषट्पदगणैरुपगीता मनोहराः ।।
दक्षिणानिल संवीताः सुमुखाः पल्लवोज्वलाः ।। (सु.सू. ६/२७-२८)

The wind blows in the south of *malayagiri*. All atmosphere is pure, forest and gardens appear beautiful due to flowering of *Palāśa, kamala, Bakula, āmra & aśoka*. Every where melodious sound of nightingale & *bhramara* (bees) are heard. The trees are full of tender leaves.

Effects on the body

हेमन्ते निचितः श्लेष्मा दिनकृद्भाभिरीरितः । कायाग्निं बाधते रोगांस्ततः प्रकुरुते बहून् ।।(च.सू.६/२२)

The *kapha doṣa* accumulated in *Hemanta ṛtu* gets liquified by the effect of hot rays of sun. The *Kāyāgni* gets diminished and produces different diseases.

Diet

पुराणयवगोधूमक्षौद्र जाङ्गल शूल्य भुक्। सहकार रसोन्मिश्रानास्वाद्यप्रिययार्पितान्।।(अ.हृ.सू.३/२०)
पिबेत् निर्गदानासवारिष्ट सीधुमार्द्वीक माधवान् ।
श्रृंङ्गवराम्बु साराम्बु मध्वम्बु जलदाम्बु च।। (अ.हृ. सू ३/२२)

One should consume food made of old barley (*Yava*), wheat (*godhūma*) & flesh cooked by holding in arrow along with honey. One should take mango juice along with them. The mango juice having heavy, sour, unctous and sweet qualities is good for health. One should drink alcoholic preparations like *āsava, ariṣṭa, sīdhu mārdvīka, mādhava* and water medicated with ginger, *khadira* (Accasia), honey & *mustā*. One should avoid heavy, cold, unctous, sour and sweet food.

Other regimen

व्यायामोद्वर्तनाघातैर्जित्वा श्लेष्माणमुल्बणम् । स्नातोऽनुलिप्तः कर्पूरचन्दनागुरुकुङ्कुमैः।।
(अ.हृ.सू.३/१९)

प्रियास्यसङ्गसुरभीन् प्रियानेत्रोत्पलाङ्कितान्। सौमनस्यकृतो हृद्यान्वयस्यैः सहितः पिबेत्।।
(अ.हृ.सू.३/२१)

One should pacify the aggravated *kapha* by proper exercise, *udvartana* (dry massage), hard massage and take bath and besmeared

with powders of *Karpūra* (cinnamomum camphora), *candana* (santalum album), *Agaru* (Aqualleria Agollacha) & *Kuṁkuma* (Crocus sativus). One should be pleased by the loved one's gazes of the lotus eyes. With pleasent mind he should take alcoholic preparation with his friends.

One should spend after noon by hearing at stories, songs, playing chess etc. They should sit in southern direction, where wind is cold, the place should be surrounded by water. The place should be devoid of sun light. One should touch the beads (*maṇi*), hear to birds singing, different types of fragrent trees should be present in the surroundings to take out the heat. Avoid day sleep (*divāsvapna*).

Treatment

तीक्ष्णैर्वमननस्याद्यैर्लघुरुक्षैश्च भोजनैः ।। (अ.हृ.सू.३/१९)

The aggravated *kapha* should be expelled out by drastic emesis (*Vamana*) & nasal instillation (*Nasya*).

Grīṣma ṛtu (ग्रीष्म ऋतु)

Features of Grīṣma ṛtu

ग्रीष्मे तीक्ष्णांशुरादित्यो मारुतो नैऋतोऽसुखः । भूस्तप्तासरितस्तन्व्यो दिशः प्रज्वलिता इव ।।
भ्रान्तचक्राह्वयुगला पयः पानाकुलामृगाः। ध्वस्तवीरुत्तृणलता विपर्णांकित पादपाः।।(सु.सू.६/३१-३२)

The sun rays are intense and scorching, wind in northern direction is unhealthy. The earth gets heated up, rivers become narrow, directions appear blazing, *cakravāka* birds and aninals roam, small trees, grass and climbers appear lifeless and trees shed their leaves.

Effects on the body

मयूखैर्जगतः स्नेहं ग्रीष्मे पेपीयते रविः ।। (च.सू. ६/२७)

The intense rays of sun dry unctousness and moisture in the body and surroundings, which leads to decrease of *kapha* and accumulation of *vāta*.

ता एवौषधयो निदधे निःसारा रूक्षा अतिमात्रं लघ्व्यो भवन्त्यापश्च ता उपयुज्यमानाः सूर्यप्रतापोपशोषित देहानां देहिनां रौक्ष्याल्लघुत्वाच्च वायोः सञ्चयमापादयन्ति ।। (सु.सू. ६/११)

If a person consumes light and dry medicine, devoid of potency in this season, then it leads to increase of lightness, dryness & *viśadata* (spreading) in the body, leading to accumulation of *vāta*.

Diet (आहार)

स्वादु शीतं द्रवं स्निग्धं अन्नपानं सदा हितम् । शीतं सशर्करं मन्थं जाङ्गलान्मृगपक्षिणः ।।

घृतं पयः स शाल्यन्नं भजन् ग्रीष्मे न सीदति । मद्यमल्पं न वा पेयमथवा सुबहूदकम् ।।
लवणाम्लकटूष्णानि व्यायामं च विवर्जयेत् ।। (च.सू. ६/२७-२९)

Always sweet, cold, unctous and liquid food is good in this season. Cold *mantha* preparation with sugar, flesh of terrestrial animals, birds, ghee, milk and rice should be consumed during *Grīṣma* ṛtu. Alcoholic preparation should be avoided, if one is addicted then large quantity of water should be mixed.

Avoid– One should avoid salt, sour and pungent food and excess of exercise.

पिबेद्रसं नातिघनं रसालां रागखाण्डवौ । पानकं पञ्चसारं वा नवमृभ्दाजने स्थितम् ।।
मोचचोचदलैर्युक्तं साम्लं मृण्मयशुक्तिभिः । पाटलावासितं चाम्भः सकर्पूरं सुशीतलम् ।।
(अ.हृ.सू. ३/३०-३१)

One should drink mango juice, churned curds, medicated with pepper, *Rāga khānḍava* a preparation having sweet, sour and salt taste, *pānaka* and *pañcasāra* (drink prepared from grapes, *madhūka*, *Kāśmarya, paruṣaka* and sugar with essense of karpūra). Kept in new earthern pot, covered with banana, or jack fruit leaves. One should drink cold water made fragrent with *pāṭala* and *karpūra*. At night milk with sugar candy should be consumed.

पिबेत् ससितं माहिषं क्षीरं चन्द्रनक्षत्र शीतलम् ।। (अ.हृ.सू. ३/३२)

Other Regimens

दिवा शीतगृहे निद्रां निशि चन्द्रांशुशीतले । भजेच्चन्दनदिग्धाङ्गः प्रवाते हर्म्यमस्तके ।।
व्यजनैः पाणिसंस्पर्शैश्चन्दनोदक शीतलैः । सेव्यमानो भजेदास्यां मुक्तामणिविभूषितः ।।
काननानि च शीतानि जलानि कुसुमानि च। ग्रीष्मकाले निषेवेत मैथुनाद्विरतो नरः।।(च.सू.६/३०-३२)

One should take rest in the cold home in afternoon & under soothening rays of moon at night. One should apply sandal wood paste to his body and forehead. Soothening touch of loved one, cold sandal wood water and wearing precious stones are beneficial. One should stay in forest, near water reservoirs, cold places beautified with flowers in *Grīṣma ṛtu* and avoid sex.

अभ्रङ्कषमहाशालतालरुणोद्धोष्णरश्मिषु ।।
वनेषु माधवीश्लिष्ठद्राक्षास्तबकशालिषु । सुगन्धि हिमपानीयसिच्यमानपटालिके ।।
कायमाने चिते चूतप्रवालफललुम्बिभिः । कदलीदलकल्हारमृणालकमलोत्पलैः ।।
कोमलैः कल्पिते तल्पे हसत्कुसुम पल्लवे । मध्यदिनेऽर्कतापार्तः स्वप्याद्धारागृहेऽथवा ।।
पुस्तस्त्रीस्तनहस्ताऽऽस्यप्रवृत्तोशीरवारिणि । स्वस्थचित्तस्य चन्दनार्द्रस्य मालिनः ।।
निवृत्तकामतन्त्रस्य सुसूक्ष्मतनुवाससः । जलार्द्रस्तालवृन्तानि विस्तृताः पद्मिनीपुटाः ।।
उत्क्षेपाश्च मृदूत्क्षेपा जल वर्षिहिमानिलाः । कर्पूरमल्लिकामाला हाराः सारिकाः शुकाः ।।
मृणालवलयाः कान्ताः प्रोत्फुल्लकमलोज्ज्वलाः ।
जङ्गमा इव पद्मिन्यो हरन्ति दयिताः क्लमम् ।। (अ.हृ.सू. ३/३३-४१)

The person should take rest in the gardens having tall trees as if touching the sky, which donot allow the sun light like *Śāla, tāla* etc. and the rest houses decorated with climbers like jasmine & grapes. It should be having screens which are sprinkled with water frequently, decorated with mango leaves and fruits. One should sleep on the bed made of banana leaf, lotus leaf & blue lotus leaf and decorated with fragrent lotus flowers or else in *dhārā gṛha* with fountain sprinkling from hands, breast or mouth of female doll.

At night

One should have food of soothening rays of moon and stars, sitting on the top of the house with white washed walls, which make the night pleasant. One should anoint paste of sandal wood, wear garlands made of pearls, flowers, and wear light cloth. The children speaking sweetly should play near by, similarly presence of birds like parrot & *maina* (love birds) gives pleasentness, wearing of bangles made of stem of lotus (*bisa nāla*) & beautiful female take away the tiredness due to *Grīṣma ṛtu*.

Varṣā ṛtu (वर्षाऋतु)

Features of Varṣa ṛtu

वर्षासु नद्योऽम्भश्छन्नोत्खंततटद्रुमाः । वाप्यः प्रोत्फुल्लकुमुदनीलोत्पलविराजिताः ।।
भूरव्यक्त स्थलश्वभ्रा बहुसस्योपशोभिताः। नातिगर्जत्स्रवन्मेघनिरुद्धर्कग्रहं नभः।।(सु.सू.६/३३-३४)

The rivers are filled with water and by the force of the current, the trees on the banks are uprooted. The lakes look beautiful with blossoming of white and blue lotus. The earth is covered with grass, so the pits cannot be made out. Earth appears beautiful with different types of grains. The rain comes with muffled sound without thunderbolts, sun & stars are covered with clouds in the sky.

Effects on body

तत्र वर्षास्वोषधयस्तरुण्योल्पवीर्या आपश्चाप्रशान्ताः क्षितिमलप्रायाः ता उपयुज्यमाना नभसि मेघावतते जलप्रक्लिन्नायां भूमौ क्लिन्न देहानां प्राणिनां शीत वातविष्टम्भिताग्निनां विदह्यन्ते विदाहात् पित्तसञ्चयमापादयन्ति ।। (सु.सू. ६/११)

In *Varṣā ṛtu* medicines are of less potency, due to excess of water content due to raining and the sky full of clouds. Land is moist with rain, so *klinnata* (moistness) in the body gets enhanced along with coldness, which produces *mandāgni* leading to improper digestion (*vidāha*), which leads to accumulation of *pitta*.

Effects on the body

आदानदुर्बले देहे पक्ता भवति दुर्बलः ।
स वर्षास्वनिलादीनां दूषणैर्बाध्यते पुनः । भूबाष्पान्मेघनिस्यन्दात् पाकादम्लाज्जलस्य च ।।
वर्षास्वग्निबले क्षीणे कुप्यन्ति पवनादयः ।। (च.सू. ६/३३-३४)

Due to the effect of *Ādāna kāla*, both body and *Agni* are weak. Rain, clouds in the sky, ice and cold wind in the atmosphere, along with the water steam, produced due to the contact of cold water and hot earth, produce *doṣa kopa* in the body and weaken the *Agni* further. The food items with sour taste, and unclean water again affect the *Agni* and vitiate the *doṣās* especially *vāta* gets aggravated.

Diet (आहार)

पानभोजन संस्कारान् प्रायः क्षौद्रन्वितान् भजेत् । व्यक्ताम्ललवणस्नेहं वातवर्षाकुलेऽहनि ।।
विशेषशीते भोक्तव्यं वर्षास्वनिलशान्तये । अग्निसंरक्षणवता यवगोधूमशालयः ।।
पुराणा जाङ्गलैमांसैर्भोज्याः यूषैश्च संस्कृतैः ।
पिबेत् क्षौद्रान्वितं चाल्पं माध्वीकारिष्टमम्बु वा ।।
माहेन्द्र तप्त शीतं वा कौपं सारसमेव वा ।। (च.सू. ६/३६-३९)

One should drink *sanskārita* (medicated) water & rice (*śāli*) along with honey. One should consume sour, salt & unctous food to pacify the aggravated *vāta* in *varṣā ṛtu*. One should consume food which protect the *agni* like old barley, wheat, rice, prepared meat soup, *dāl* soup (*yūṣa*). One should drink little quantity of alcoholic preparations like *mādhvīka* & *ariṣṭa* along with honey.

धातुपोषकरसानुत्पादाच्च धातुक्षयेन वातकारी ।। (च.पा. on च.सू. ६/३४)

Agnimāndya produces *kapha pitta prakopa,* due to improper digestion. In *varṣā ṛtu* due to improper nourishment of *dhātus* there is *vāta vṛddhi.*

क्षौद्रं च यद्यपि वातप्रकोपि तथाऽपि वार्षिक क्लेदशमनार्थं स्वल्पमात्रया क्षौद्रान्वित पदेन विहितं ।। (च.पा. on च.सू. ६/३९)

Honey increases *vāta,* but it can be taken in less quantities to reduce the excessive moisture (*Klinnata*) in the body.

One should drink rain water, boiled water, well water or water from reservoir (*sarovara*).

मस्तु सौवर्चलाढ्यं वा पञ्चकोलखचूर्णितम् ।

One can consume supernatent part of curds (***Dadhi mastu***) mixed with powder of *sauvarcala* salt, and *pañcakola.*

Avoid

नदीजलोदमन्था उदमन्थ– उदक प्रधानो मन्थः उदमन्थः । (च.पा.)

One should avoid river water and churned preparation having more water.

Other regimens (विहार)

उदमन्थं दिवास्वप्नं अवश्यायं नदीजलम् । व्यायामातपं चैव व्यवायं चात्र वर्जयेत् ।। (च.सू. ६/३५)
प्रघर्षोद्वर्तनस्नानगन्धमाल्यपरो भवेत् । लघु शुद्धाम्बर स्थानं भजेदक्लेदि वार्षिकम् ।।

One should avoid day sleep, exposure to mist, excessive exercise, hot sun and sexual intercourse in *varṣā ṛtu.*

During bath rubbing with thick cloth, powders of unctous drugs, wearing fragrent garland, light, clean cloth and staying in a place devoid of moisture are indicated during *varṣā ṛtu.*

Treatment (पञ्चकर्म)

आस्थापनं शुद्ध तनुजीर्णं धान्यं रसान् कृतान् ।

After purification of body ie *vamana* and *virecana, Niruha* or *āsthāpana basti* should be given.

Prāvṛṭ ṛtu (प्रावृट् ऋतु)

Features of Prāvṛṭ ṛtu

प्रावृष्यम्बरमानद्धं पश्चिमानिलकर्षितैः । अम्बुदैर्विद्युदद्योताप्रस्तुतैस्तुमुलस्वनैः ।।
कोमलश्यामशष्पाढ्या शक्रगोपोज्ज्वला मही। कदम्बनीप कुटजसर्जकेतकीभूषिताः।।(सु.सू.६/३२)

Wind blows in the western direction, sky is full of lightening & clouds with thunder bolts. Earth is covered with delicate, dark green coloured grass & brightened with *śakragopa.* Plants of *kadamba, nīpa, kuṭaja, sarja, & ketaka* beutify the earth in *Prāvṛṭ ṛtu.*

Effects on the body

स सञ्चयः प्रावृषि चात्यर्थं जलोपक्लिन्नायां भूमौ क्लिन्न देहानां प्राणिनां शीतवातवर्षेरितो वातिकाम् व्याधीन् जनयति ।। (सु.सू. ६/१३)

Vāta gets aggravated during *prāvṛṭ ṛtu* as the excessive moisture & coldness in the atmosphere increase bodily *klinnata* (moisture) कोष्ठतोदसञ्चारादीन् जनयति disease like pain in abdomen & flatulence are more in this *ṛtu* due to *vāta sañcaya. Ṛtu caryā* is similar to that of *varṣā ṛtu.*

Śarat ṛtu (शरत् ऋतु)

Features of Śarat ṛtu

बभ्रुरूष्ण शरद्यर्कः श्वेताभ्रविमलं नमः । तथा सरांस्यम्बुरुहैर्भान्ति हसांद्यट्टितैः ।।
पङ्क शुष्कद्रुमद्रुमाकीर्णं निम्नोन्नतसमेषु भूः। बाणसप्ताह्वबन्धूककाशासन विराजिताः।।(सु.सू.६/३५-३६)
बभ्रुः कपिलपिङ्गलः ।

The sun shines with copper colour and hotness, the sky is clear with white clouds. The ponds are filled with lotus leaves vibrating by the touch of moving swans. The earth is filled with wet mud and ant hills. The plants of *arjuna, bāṇa, saptaparṇi, bandhūka, kāśa* and *asana* flower during this *ṛtu*.

Effects on the body

वर्षाशीतोचिताङ्गानां सहसैवार्करश्मिभिः। तप्तानामाचितं पित्तं प्रायः शरदि कुप्यति।।(च.सू.६/४१)

During *Varṣā ṛtu* body will be accustomed for coldness in the atmosphere and sudden heat of the sun rays makes the body hot and aggravates the *pitta* accumulated during *Varṣā ṛtu*.

शरदि प्रविरलमेघे वियत्युपशुष्यति पङ्केऽर्ककिरण प्रविलायितः पैत्तिकान् व्याधीञ्जनयति ।।
(सु.सू.६/११)

The *pitta* accumulated during *varṣā ṛtu* gets aggravated during *śarat ṛtu* due to the reduction of clouds and increased intensity of sun rays. The wet mud gets dried by this and produce *paittika* disorders.

Diet

तत्रान्नपानं मधुरं लघु शीतं सतिक्तकम् । पित्तप्रशमनं सेव्यं मात्रया सुप्रकाङ्क्षितैः ।।
लावान् कपिञ्जलानेणानुरभ्रञ्छशरभान् शशान् । शालीन् सयवगोधूमान् सेव्यानाहर्घनात्यये ।।
वसां तैलमवश्यायमौदकानूपमामिषम् । क्षारं दधी दिवास्वप्नं प्राग्वातं चात्र वर्जयेत् ।।
दिवा सर्यांशु संतप्तं निशि चन्द्रांशु शीतलम् । कालेन पक्वं निर्दोषमगस्त्येनाविषीकृतम् ।।
हंसोदकमिति ख्यातं शारदं विमलं शुचि। स्नानपानावगाहेषु हितमम्बु यथाऽमृतम्।।(च.सू.७/४२-४७)

One should consume sweet, bitter, light, cold and *pitta śāmaka* food in the required quantity accordingly. Flesh of *lāvā, kapiñjala, eṇa, urabhra, śaśa, śāli* variety of rice, barley & wheat should be consumed. One should avoid fat, oil, mist, meat of marshy and aquatic animals, alkali, curds, daysleep & easterly wind. One should use the water which is purified by the rays of sun in day time and rays of moon at night time and by the birth of *agastya star,* for the purpose of drinking, bathing and immersing. This *Haṃsodaka* is devoid of *doṣa*, clear, pure and like nector (*amṛta*).

तिक्तं स्वादु कषायं च क्षुधितोऽन्नं भजेल्लघु । शालि मुद्ग सिता धात्री पटोल मधुजाङ्गलम् ।।

Food having bitter, sweet and astringent tastes, light in quality should be consumed after feeling of hunger. *Śāli* variety of rice, green gram, sugar candy, goose berry (*āmalaki*), snake gourd (*paṭola*), honey and flesh (*jaṅgala mamsa*) should be taken in diet.

Other Regimens

शारदानि च माल्यानि वासांसि विमलानि च। शरत्काले प्रशस्यन्ते प्रदोषे चेन्दुरश्मयः।।(च.सू.६/४८)

The garlands made of flowers of *śarat ṛtu* should be worn along with clean cloth. Moon rays in the first 3 hours of night is conducive for health.

One should avoid mist, day sleep and *prāgvāta* which increase *kapha*.

चन्दनोशीर कर्पूर मुक्तास्त्राग्वसनोज्ज्वलः। सौधेषु सौधधवलां चन्द्रिकां रजनी मुखे।।(अ.हृ.सू.३/५३)

One should apply *candana, uśīra*, wear the garlands of pearl & clean cloth and sit over the terrace of white washed house and enjoy the moon light in the first part of night. Even in *Kṛṣṇa pakṣa* one should enjoy the cold breeze at night.

Avoid

तुषार क्षार सौहित्यदधितैलवसातपान्।तीक्ष्णमद्यदिवास्वप्नपुरोवातान् परित्यजेत्।।(अ.हृ.सू.३/५४)

One should avoid mist, alkalis (*Kṣara*), excessive eating, curds, oil, muscle fat (*vasā*), strong alcoholic preparations, day sleep & wind in eastern direction.

Treatment (पञ्चकर्म)

तज्जयाय घृतं तिक्तं विरेको रक्तमोक्षणम् ।। (अ.हृ.सू. ३/५०)

तिक्तस्य सर्पिषः पानं विरेको रक्तमोक्षणं । धाराधरात्यये कार्यमातपस्य ।। (च.सू.६/४४)

Expulsion of aggravated pitta should be done by purgation (*virecana*) & blood letting (*Rakta mokṣaṇa*) after *sṇeha pāna* with bitter ghee at the end of *varṣā ṛtu*.

Yama Daṁṣṭra (यमदंष्ट्रा)

कार्तिकस्य दिनान्यष्टावग्रहणस्य च। यमदंष्ट्रा समाख्यातः स्वल्पभुक्तोहि जीवितः।।(शा.सं.२/३०)

Last 8 days of *Kārtika* month & first 8 days of *Mārgaśira* are called as the teeth of *yama* & one will be heatlhy only if he consumes light food.

Three sub pillars of life (त्रय उपस्तम्भा)

This conprises of two words *traya* ie three & *upastambha* ie sub supports of the body.

स्तम्भयति धारयति इति उपस्तम्भः ।। यथा गृहधारणनियुक्तप्रधानस्तम्भसमीपवर्ती तद्बलदायक उपस्तम्भः।। (च.पा., च.सू. ११/३५)

That which supports the body is *upastambha*. As the subpillars near the main pillars help to strengthen the house, similarly these

upasthaṃbha support the body along with *Tristhūṇa* the main three pillars ie *vāta, pitta & kapha*.

त्रयः उपस्तम्भाः इति आहारः स्वप्नो ब्रह्मचर्यमिति । एभिस्त्रिभिर्युक्तियुक्तैरुपस्तब्ध-मुपस्तम्भैः शरीरं बलवर्णोपचयोपचितमनुवर्तते यावदायुः संस्कारात् संस्कारं अहितमनुपसेवमानस्य य इहैवोपदेक्ष्यते ।। (च.सू. ११/३५)

Food, sleep & celibacy are considered as three supports of life. These support the life by providing strength, complexion nourishment & maintenance of body in the whole life span. The measures which are conducive to the body & nonconducive to the body should be given emphasis.

Effects of good company on Health

बुद्धिविद्यावयःशील धैर्यस्मृतिसमाधिभिः । वृद्धोपसेविनो वृद्धाः स्वभावज्ञा गतव्यथाः ।।
सुमुखाः सर्वभूतानां प्रशान्ताः शंसितव्रताः । सेव्याः सन्मार्गवक्तारः पुण्यश्रवणदर्शनाः ।।
(च.सू.७/५८-५९)

The persons who are experienced by intelligence, learning, age, conduct, patience, memory, meditation, who are matured & educated, who have humanitarian values, who are without anxiety, those who behave well with every one, those who are peaceful, those who follow the path of truth, those who adopt good conduct & those who are auspicious by name & virtue are considered under good company, one should interact with good people.

The person who interacts with good people will be endowed with *sātvika* qualities. By the mental peace person will be devoid of stress & mental disturbances, thus helps in prevention of psychological & psychosomatic diseases.

Effects of bad company on Health

पापवृत्तवचः सत्वाः सूचकाः कलहप्रियाः । मर्मोपहासिनो लुब्धाः परिवृद्धद्विषः शठाः ।।
परापवादरतयश्चपलाः रिपुसेविनः । निर्घृणास्त्यक्तधर्माणः परिवर्ज्याः नराधमाः ।।
(च.सू.७/५६-५७)

Person who indulges in sinful acts, speech & mind, back biters, those who quarrel, those who indulge in odd remarks, greedy, those who are jelous about others property, cruel, always blame others, fickle minded, those who serve the enemies, those devoid of kindness, those who do not follow virtuous rules of life are considered as had company & interaction with them should be avoided.

Interaction with the bad persons will have adverse effects on mind which may lead to psychological disturbances & many psychosomatic disorders.

●

Chapter- 4
CODES OF CONDUCTS

Āyurveda is the science of life with the primary aim of maintenance of health. Earlier many points for maintaining health have been discussed in detail, now different aspects for mental health like *sadvratta* (codes & conducts of life), *ācāra rasāyana* & *dhāraṇīya vega* will be discussed.

Codes of conducts of life

Sadvṛtta comprises of two words *'sat'* meaning good & *vṛtta meaning ācāra* or regimen.

'सतां सज्जनानां 'वृत्तं' व्यवहारजातं सद्वृत्तम् ।। (च.पा. on च.सू. ८/१७)

Association with good people leads to development of good behavior, which can be considered as *sadvṛtta*.

तत्रेन्द्रियाणां समनस्कानामनुपतप्तानामनुपतापाय प्रकृतिभावे प्रयतितव्यमेभिर्हेतुभिः तद्यथा- सात्म्येन्द्रियार्थसंयोगेने बुद्ध्या सम्यगवेक्ष्यावेक्ष्य कर्मणां सम्यक् प्रतिपादनेन देशकालात्मगुणविपरीत उपासनेन चेति । तस्मादात्महितं चिकीर्षिता सर्वेण सर्वं सर्वथा स्मृतिमास्थाय सद्वृत्तमनुष्ठेयम् ।। (च.सू. ८/१७)

For maintaining health of sense organs & the mind one has to observe following rules.

1. Proper interaction of sense organs ie सम्यग्योग of इन्द्रिय,

2. Performing of different actions after proper thoughtful analysis by his intellgence.

3. देशकालात्मगुणविपरीतोपासनेन ie by acting in contradistinction to the qualities of place, season & ones constitution ie *prakṛti*.

सतां वृत्तमनुष्ठानं देहवाङ्मनः प्रवृत्तिरूपं सदवृत्तमनुष्ठेयम् ।। (च.पा. on च.सू. ८/१७)

Always one should act in such a way that, he will be always healthy by remembering all the things mentioned in *sadvṛtta*.

Principles

१. सद्वचनम् अनुष्ठेयानाम् । (च.सू. २५/४०)
२. हर्षः प्रीणनानां । (च.सू. २५/४०)
३. निवृत्तिः पुष्टिकराणां । (च.सू. २५/४०)
४. नास्तिको वर्ज्यानां । (च.सू. २५/४०)

५. लौल्यं क्लेशकराणां । (च.सू. २५/४०)
६. असद्ग्रहणं सर्वाहितानां । (च.सू. २५/४०)
७. विषादो रोगवर्धनानां । (च.सू. २५/४०)

In *Caraka samhita* word of noble persons is considered as best among the adoptable behaviors. Happiness is best among nourishing things. Detatchment is best among enhancers of nourishment. So these have been mentioned in *sadvritta*. The person who does not believe in god should be boycotted. Greed is prime among trouble makers. Words of the wicked is prime among the factors leading to harmful effects. So these have to be abandoned.

Sadvṛtta not only includes mental faculties, but also rules related with general hygiene, religion, food consumption, sexual intercourse & exercise, following which leads to prevention of psychological, physical & psychosomatic disorders.

Similar principles are mentioned in *ācāra rasāyana* & *dhāraṇīya vegas*. *Āyurveda* believes that mind, soul & body are like the pillars of life. The combination of these three are responsible for *Puruṣa* as well as the world. Even the disease occur either in the body or mind.

त्यागः प्रज्ञापराधानां इन्द्रियोपशमः स्मृतिः। देशकालत्मविज्ञानं सदवृत्तस्यानुवर्तनम्।। (च.सू.७/५३)

One should avoid intellectual errors (*Prajñāparādha*), take care of sense organs, by avoiding excessive, improper or disuse of sense organs, knowledge about place, time & one self & adopt codes of conducts mentioned in *Āyurveda* to prevent diseases.

In the present scenario most of the diseases are multifactorial diseases, where involvement of mind is invariably present at one or the other stage of the disease. So following the above said principles properly will lead to prevention.

1. Practicing the regimen which are wholesome for sense organs *Indriyopaśama*.

कालबुद्धीन्द्रियार्थानां योगो मिथ्या न चाति च । द्वयाश्रयाणां व्याधीनां त्रिविधो हेतु सङ्ग्रहः ।।
(च.सू.१/५४)

Causative factors for physical & mental diseases are wrong utilization, over utilization & non utilization of objects of sense organ, time & intellect. So intelligent person should avoid them & prevent diseases.

2. Good memory power. स्मृति

One who has good memory power can remember rules well & prevent diseases.

3. Knowledge about place, time & him self देशकालात्म विज्ञान

One who has proper knowledge about his place of residence, can follow different regimens related to food & habits accordingly & prevent diseases. Time factor is very important whether it is the season, time of day or age of the person in prevention of diseases.

Knowledge about him self ie *prakṛti*, *Agni* etc is a must for following any regimen properly.

4. Observance of codes of conduct सद्वृत्तस्यानुवर्तनम् ।

Practices to prevent psychological disturbances

देवगोब्राह्मणगुरु वृद्धसिद्धाचार्यानर्चयेत् अग्निमुपाचरेत् ।
औषधीः प्रशस्ताः धारयेत् द्वौ कालावुपस्पृशेत् ।। (च.सू. ८/१८)

One should worship god, cow, brahmin, preceptors, elders, sages & teachers. One should worship fire, wear auspicius herbs. One should do Vedic rituals in morning & evening twice.

होता यष्ट, दाता, चतुष्पथानां नमस्कर्ता, बलीनामुपहर्ता, अतिथीनां पूजकः, पितृभ्यां पिण्डदः, वश्यात्म, धर्मात्मा, हेतीवीर्ष्युः, कले नेर्ष्युः, निश्चिन्तः, निर्भीकः, ह्रीमान्, धीमान्, महोत्साहः, दक्षः, क्षमावान्, धार्मिकः, आस्तिकः, विनय बुद्धिविद्याभिजनवयोवृद्धसिद्धाचार्याणामुपा-सिता, छत्री, दण्डी, मौली, सोपानत्को युगमात्रदृग्विचरेत्, मङ्गलाचारशीलः।। (च.सू. ८/१८)

One should perform religious ceremonies, donate, bow down at the squares, offer *balis*, respect the guests, offer *pinda* (ball of rice) to fore fathers, has to control the senses, religious, desirous of work but not on the fruit, fearless, intelligent, enthusiasm, able, forgive, pious, have faith in god, obedient, clever, learned, devoted to teachers, elders & sages, to prevent psychological disturbances.

One who holds umbrella, stick, wears turban, shoes, who sees six feet forward while walking, who practices auspicious way can prevent many problems.

प्राक् श्रीमद् व्यायामवर्जी च स्यात् सर्वप्राणिषु बन्धभूतः स्यात् क्रुद्धानामनुनेता, भीतानामाश्वासयिता दीनानामभ्युपपत्ता, सत्यसन्धः सामप्रधानः परपुरुषवचनसहिष्णुः अमर्षघ्नः प्रशमगुणदर्शी रागद्वेषहेतूनां हन्ता च ।। (च.सू. ८/१८)

A person should treat all beings equally, pacify the anger of angry person, take away the fear of frightened person, care for the suffering person, always speek truth, he should be peaceful, tolerate harsh words and avoid the factors leading to anger greed etc.

Rules regarding hygiene

मलायनेष्वभीक्ष्णं पादयोश्च वैमल्यमादध्यात् त्रीः पक्षस्य केशस्मश्रु लोमनखान् संहारयेत्, नित्यमनुपहतवासाः, सुमनाः, सुगन्धि स्यात्, साधु वेशः, प्रसिद्ध केशः मूर्धाश्रोत्रघ्राणपाद तैल नित्यः, धूमपः, सुमुखः, (च.सू. ८/१८)

One should clean excretary orifices & feet frequently. One should cut hair, mustache, body hair & nails thrice in fifteen days, wear clean good cloth every day, pleasent mind, apply scent, decently dress, comb the hair, apply oil to head, ear, nose & feet every day. One should smoke medicated cigarettes & should have pleasent face.

कुचेलास्थिकण्टकामेध्यकेशतुषोत्करभस्मकपालस्नानबलिभूमिनां परिहर्ता । (च.सू. ८/१८)

One should avoid places with dirty cloths, bones, thorns, impure hair, grass, garbage, ash, pieces of mud pot & places of bath & worship.

न शब्दवन्तं मरुतं मञ्चेत्, नानावृतमुखो जृम्भा क्षवथुं हास्यं वा प्रवर्तयेत् न नासिकां कुष्णीयात्, न दन्तान् विघट्टयेत्, न नखान् वादयेत्, नास्थीनभिहन्यात्, न भूमि विलिखेत्, न छिन्द्यात्तृणं, न लोष्टं मृद्नीयात्, न विगुणमङ्गैश्चेष्टित, ज्योतींव्यमेध्यमशस्तं च नाभिवेक्षेत, न हुंकुर्यात् शवं, न पापवृतान् स्त्रीमित्रभृत्यान् भजेत, नावरान् उपासीत, नजिव्हान् रोचयेत् । (च.सू.८/१९)

One should not release flatus with sound, one should not yawn, sneeze, langh without covering the mouth, should not itch the nostrils, grind the teeth, make sound with nail, strike the bones, scrape the earth, cut the grass, grind the mud lump, do improper movements of body parts, should not see unrighty inauspious undesirable objects. One should not produce 'hum' sound infront of dead body. One should not have relation with women, friends & servants having bad conduct.

Rules regarding speech

One should wish, speak less, timely, conducive & in sweet language. One should not speak lies, point out mistakes of others, disclose the secretes of other. One should not speak badly about good persons & teachers. One should not speak more.

नाशुचिरभिचारकर्मचैत्यपूज्यपूजाध्ययनमभिनिर्वर्तयेत् । (च.सू. ८/२३)

One should not do any rituals like worshipping tree, superiors or study while impure.

Rules regarding diet

नारत्नपाणिर्नास्नातो नोपहतवासा नाजपित्वा नाहुत्वा देवताभ्यो नानिरूप्या पितृभ्यो नादत्वा गुरुभ्यो नातिथिभ्यो नोपाश्रितेभ्यो नापुण्यगन्धो नामाली नाप्रक्षालितपाणिपादवदनो नाशुद्धमुखो नोदङ्मुखो न विमना नाभक्ताशिष्टाशुचि क्षुधितं प्रोक्षणोदकैर्न मंत्रैरनभिमंत्रित न कुत्सयन्नकुत्सितं नतिकूलोपहितमन्नमाददीत, न पर्युषितमन्यत्र मांसहरितकशुष्क शाकफलभक्ष्येभ्यः नारोषभुक्स्यादन्यत्र दधिमधुलवणसक्तु सर्पिर्भ्यः न नक्तं दधि भुञ्जीत न सक्तूनेकानश्नीयान्ननिशि न भुक्त्वा न बहून्न द्विर्नोदकान्तरितान् न छित्वा द्विजैर्भक्षयेत् ।। (च.सू. ८/२०)

One should not take food without wearing precious stones, taking bath, wearing torn cloth, without chanting mantras, without praying god, without offering to forefathers, teachers, guests, dependents, without applying scent, without wearing garland, without washing hands, feet & face, without clearing mouth, without concentration, surrounded by bad people, dirty & hungry people, without sprinkling holy water, chanting mantra and without abusing others. The food should not be offered by enemies.

The stale food should not be taken except meat, ginger, dry vegetables, fruits & sweets. One should not consume food completely except curds, honey, salt, *saktu* & ghee, one should not consume curds at night. One should not consume *saktu,* without mixing with ghee, sugar or at night, after taking food in large quantity, twice in a day, not along with water, not tearing with teeth.

Rules regarding urges

नानृजुः क्षयान्नाद्यान्न शयीत न वेगितोऽन्यकार्यः स्यात् न वाय्वग्निसलिलसोमार्कद्विजगुरु प्रतिमुखं निष्ठीविका वर्चोमूत्राण्युत्सृजेत् न पन्थानमवमूत्रयेन्न जनयति नान्नकाले न जपहोमाध्ययनबलिमङ्गलक्रियासु श्लेष्मसिंघाणकं मुञ्चेत् ।। (च.सू. ८/२१)

One should not sneeze, eat or sleep in prone position, one should not do any work with holding the natural urges, one should not spit, micturate and defecate infront of wind, fire, water, sun moon, brahmin, teachers, on the road side & public places. While taking food, chanting mantra, reading, offering bali and during auspicious ceremonies, one should not clean the nose or take out *kapha*.

Rules regarding relation with females

न स्त्रियमवजानीत, नातिविश्रम्भयेत्, न गुह्यमनुश्रावयेत्, नाधिकुर्यात् । न रजस्वलां नातुरां नामेध्यां नाशस्तां नानिष्ठरूपाचारोपचारां नादक्षां नादक्षिणां नाकामां नान्यकामां नान्यस्त्रियं नान्ययोनिं नायोनौ न चैत्यचत्वरचतुष्पथोपवनस्मशानाघातनसलिलौषधिद्विजगुरुसुरालयेषु न सन्ध्योर्नातिथिषु नाशुचिर्नाजग्धभेषजो नाप्रणीतसङ्कल्पो नानुपस्थितप्रहर्षो नामुक्तवान्नात्यशितो न विषमस्थो न मूत्रोच्चारपीडितो न श्रम व्यायाम उपवासक्लमाभिहतो नारहसि व्यवायं गच्छेत् ।।
(च.सू. ८/२२)

One should not insult women or depend on them or reveal secretes to them or authorize them. One should not indulge in sexual intercourse with menstruating women, suffering from disease, impure, having infection, not good looking, having bad conduct, bad manners, not having skill & not friendly. One should avoid sex with one who is not interested in sex, interested in other person, other's wife & other caste. Sexual intercourse in any other organ than genitals is contra indicated. Sexual intercourse should not be done under holy trees, squares or public places, cremetorium, slaughter house, in water, in clinics, in home of brahmin, teacher & temples. Sexual intercourse should not be done in morning, evening time & on inauspicious day, one should not do sexual intercourse while impure, without taking drugs enhancing *śukra* (aphrodiasac), without desire, without erection, without taking food, or after having heavy meals, in uneven place, under the pressure of urge for micturation, when tired, after exercise, fasting, having exhaustion or in place devoid of privacy.

Rules regarding study

न विद्युत्स्वनार्तवीषु नाम्युदितासु दिक्षु नाग्नि संप्लवे न भूमिकम्पे न महोत्सवे नोल्कापाते न महाग्रहोपगमने न नष्टचन्द्राणां तिथौ न सन्ध्यायोर्नामुखाङ्गुरोर्नावपथितं नातिमात्रं न तांतं न विस्वरं नानवस्थितपदं नातिद्रुतं न विलम्बितं नतिक्लीबं नात्युच्चैर्नातिनीचैः स्वरैरध्ययनमभ्यसेत् ।। (च.सू. ८/२४)

One should not study during unseasonal lightening or when directions look as if being burnt, during earth quakes, fairs, fall of meteorites, eclipses, new moon day, during sunrise or sunset. One should not study before teacher's initiation, one should not chant incomplete *mantra*, either in low or very high pitch, nor very slow or very fast and without proper voice.

General rules

नाति समयं जह्यात्, न नियमं भिन्द्यात् न नक्तं नादेशे चरेत् न सन्ध्यास्वभ्यवहाराध्ययनस्त्री-स्वप्नसेवी स्यात्, न बालवृद्धलुब्ध मूर्खक्लिष्ट क्लीबैः सह सख्यं कुर्यात्, न मद्यद्यूतवेश्याप्रसङ्गरुचि स्यात्, त गुह्य विवृणुयात्, न किञ्चिदवजानीयात् नाहं मानी स्यान्नादक्षो नादक्षिणो नासूयकः, न ब्राह्मणान् परिवेदत्, न गवां दण्डमुद्यच्छेत् न वृद्धान्न गुरुन्न गणान्न नृपान् वाऽधिक्षिपेत्, न बान्धवानुरक्तकृच्छ्रद्वितीयगुह्यज्ञान् बहिष्कुर्यात् । (च.सू. ८/२५)

One should not waste time, break the rules mentioned in classics, one should not roam at night or roam in unknown place. One should not take food, read or indulge in sexual intercourse or sleep in evening time. One should not be friendly with small childern,

elderly, greedy persons, fools, working in odd jobs or impotent person. One should not drink alcohol, gamble or go with prostitutes. One should not expose the secretes of other & insult others. One should not have ego, jelousy or abuse *brahmin* & beat cow with stick. One should not accuse or insult elders, teachers, many people & king. One should not move away from relatives, loved ones who help in difficulty & knows the secretes.

न कार्यकालमतिपातयेत्, ना परीक्षितमभिनिविशेत्, नेन्द्रियवशगः स्यात्, न चञ्चल-मनोऽनुभ्रमयेत्, न बुद्धीन्द्रियाणामतिभारमादध्यात्, न चातिदीर्घसूत्री स्यात्, न क्रोधहर्षावनुविदध्यात् न शोकमनुवसेत्, न सिद्धावुत्सेकं गच्छेन्नासिद्धौ दैन्यं, प्रकृतिमभीक्ष्णं स्मरेत्, हेतुप्रभावविनिश्चितः स्याद्धेत्वरम्भनित्यश्च न कृतमित्याश्वसेत् न वीर्यं जह्यात्, नापवादमनुस्मरेत् ।। (च.सू. ८/२७)

One should not post pone the works, without proper examination one should not start any work. One should not be under the control of sense organs, one should not allow the fickle mind to rule, one should not over burden the intellect & senses, one should not delay the work, one should not act during intense anger or happiness, one should not be under grief or over joyous of ones achievements or desperate for the failure and one should remember about his own nature. Always one should have faith in cause & effect. One should feel relieved that the work is complete, one should not lose spirit or remember the insults done earlier.

Rules regarding fire worship

नाशुचिरुत्तमाज्याक्षततिलकुशसर्षपैरग्नि जुहुयादात्मानमाशीर्भिराशासनः अग्निर्मे नापगच्छे-च्छरीराद्वायुर्मे प्राणानादधातु विष्णुर्मे बलमादधातु इन्द्रो मे वीर्यं शिवा मां प्रविशन्त्वाप आपोहिष्ठेत्या पः स्पृशेत्, द्विः परिमृज्योष्ठौ पादौ चाभ्युक्ष्य मूर्धनि खानि चोपस्पृशेदभ्दिरात्मानं हृदयं शिरश्च ।। (च.सू. ८/२८)

One should not offer ghee, rice, grains, sessame (*tila*), grass & mustard when he is in impure condition. One should wish well being of him self & chant following *mantra*.

- Let the fire not get away from my body.
- Let the wind may protect my life.
- Let lord *viṣṇu* give me strength.
- Let *Indra* give me energy.
- Let the holy water enter my body.

One should touch the water & *chant āpo-hi-ṣṭhā mantra*. One should wash lips & feet twice with water and sprinkle water over ear, eye, head, heart & body orifices.

Rules regarding social relations

ब्रह्मचर्यज्ञानदानमैत्रीकारुण्यहर्षोपेक्षाप्रशमपरश्च स्यादिति ।। (च.सू. ८/२९)

One should follow path of abstinance (*brahmacarya*), knowledge, donations, friendship, happiness, detatchment & peace.

Rules regarding other behavior

नान्यस्वमाददीत, नान्यस्त्रियमभिलषेन्नान्यश्रियं न वैरं रोचयेत्, न कुर्यात् पापं, न पापेऽपि पापि स्यात् नाधार्मिकैर्न नरेन्द्रद्विष्टैः सहासीत, नोन्मत्तैर्न पतितैर्नभ्रूणहन्तृभिर्न क्षुद्रैर्न दुष्टैः, न दुष्टयानान्यरोहेत्, नाजानुसमासनमध्यासीत, नानास्तीर्ण मनुपहितमविशालमसमं वा शयनं प्रपद्येत, न गिरिविषम-मस्तकेष्वनुचरेत् न द्रुममारोहेत्, न जलोग्रवेगामवगाहेत्, न कुलच्छायामुपासीत, नाग्न्युत्पातमभितश्चरेत्, नोच्चैर्हसेत् ।

One should not desire for others money, others wife or wealth. One should not have enemity, not do sin or interact with the person who indulges in sinful act, one should not interact with bad people or kings enemy, mad, mean minded persons & who does abortions.

One should not ride dangerous vehicles, sit on seat of knee height, sleep on uneven or small bed, without pillow & not covered properly. One should not walk on uneven slopes of hills, climb trees, bath in fast flowing river, one should not stamp the shadow of great person in their family or take shulter in shadow on banks of river, one should not move near big fire place or laugh loudly.

न चैत्यध्वजगुरुपूज्यशस्त्रच्छायामाक्रमेत्, न क्षपास्वमरसदन चैत्यपचत्वरचतुष्पथोपवनश्म-शानघातनान्यसेवेत्, नैकः शून्यग्रहं न चाटवीमनुप्रविशेत्, न पापवृत्तान् स्त्रीमित्रभृत्यान् भजेत्, नोत्तमैर्विरुध्येत्, नवरानुपासीत नानार्यमाश्रयेत्, न साहसातिस्वप्नप्रजागरस्नानपानान्यासेवेत, नोर्ध्व-जानुश्चिरं तिष्ठेत्, न व्यालनुपसर्पेन्न दंष्ट्रिणो न विषाणिनः, परोवातातप अवश्यायातिप्रवाताञ्जह्यात्, कलिं नारभेत, नासुनिभृतोऽग्निं उपासीत, नोच्छिष्ठो नाधः कृत्वा प्रतापयेत्, नाविगतक्लमो नानाप्लुतवदनो न नग्न, उपस्पृशेत्, न स्नानशह्या स्पृशेदुत्तमाङ्गं, न केशग्राण्याभिहन्येत्, नोपस्पृश्य ते एवं वाससि बिभृयात्, न स्पष्ट्वा रत्नाज्यपूज्यमङ्गलसुमनसोऽभिनिष्क्रामेत्, न पूज्यमङ्गलान्यपसव्यं गच्छेन्नेतराण्यनुदक्षिणम् ।। (च.सू. ८/१९)

One should not cross the shadow of sacred tree, flags, teacher, holy & inauspicious things. One should not go to temple, sacred tree, cross roads, gardens, cremations & slanghter houses at night, one should not visit haunted houses, forest alone, one should not be in the company of bad ladies, friends & servants. One should not speak against superior people or serve the inferior people & depend on bad people. One should not produce fear or do work which is not to his capacity. One should not sleep in excess or be awake through out night, one should not take bath & drink water repeat-

edly, one should not eat in excess and one should not sit for a long time with knees up. One should not go near snakes or animals with dangerous teeth & horns. One should avoid wind in eastern direction, excess sunlight, mist & fierce wind, one should not initiate quarrel. One should not go near fire without concentration, or without taking bath, after taking food, one should not heat his body by keeping fire below. One should not take bath during exhaustion, without washing face, without wearing cloth, or wipe head with the cloth worn below and strike the tip of hair. After taking bath one should not wear the same cloth worn earlier or should not go out without touching gems, ghee, auspicious objects, flowers & feet of respectable persons. One should not walk by keeping respectable persons, auspicious objects in left side or to the right side.

Ācāra Rasāyana

सत्यवादिनमक्रोधं निवृत्तं मद्यमैथुनात् । अहिंसकमनायासं प्रशान्तं प्रियवादिनम् ।।
जपशौचपरं धीरं दाननित्यं तपस्विनम् । देवगोब्राह्मणाचार्यगुरुवृद्धार्चने रतम् ।।
आनृशंस्यपरं नित्यं नित्यं करुणवेदिनम् । समजागरणस्वप्नं नित्यं क्षीरघृताशिनम् ।।
देशकालप्रमाणज्ञं युक्तिज्ञमनहङ्कृतम् । शस्ताचारमसंकीर्णमध्यात्मप्रवणेन्द्रियम् ।।
उपासितारं वृद्धानामास्तिकानां जितात्मनाम् । धर्मशास्त्रपरं विद्यान्नरं नित्यरसायनम् ।।
गुणैरेतैः समुदितैः प्रयुङ्क्ते यो रसायनम् । रसायनगुणान् सर्वान् यथोक्तान् स समश्नुते ।।
इत्याचार रसायनम् ।। (च.चि. १/४/३०-३५)

One should always speak truth, refrain from anger, alcohol, sexual act & voilence. One should be peaceful, avoid exertion, speak sweetly, practice *japa* (chanting names of god) & cleanliness. One should be couragious, generous, perform penance, respect god, *brahmin*, preceptors & elders, be away from cruelty and always kind to all.

One should sleep & get up at proper time, take milk & ghee every day, have knowledge about place, time, should have proper planning with intelligence, not egoistic, have good conduct, be devoid of wrong thoughts, inclined towards philosophy, have belief in god, serve elders, read religious books. He always will be endowed with qualites of rejuvenation. If person having above said qualities consumes rejuvenating drugs, he will be endowed with all qualities of rejuvenation.

Dhāraṇīya vega, sadvṛtta & Acāra arāyana are based on similar principles which help to control the mind & prevent psycho-

logical disturbances. Thus these not only prevent them, but also help to treat *psychosomtic* diseases.

Dhāraṇīya Vegas (Suppressible urges)

One desirious of his well being has to suppress certain urges like doing work, which is more to his capacity, which will lead to unwanted effect on the body & bad deeds mentally, orally or physically.

लोभशोकभयक्रोधमान वेगान् विधारयेत्। नैर्लज्ज्येर्ष्यातिरागाणामभिध्यायाश्च बुद्धिमान्।।(च.सू.७/२७)

Similarly one should control urges of greed, grief, fear, anger, ego, shamelessness, jelousy, excessive attachment & desire for things possessed by others.

परुषस्यातिमात्रस्य सूचकस्यानृतस्य च। वाक्यस्याकालयुक्तस्य धारयेद्वेगमुत्थितम्।। (च.सू.७/२८)

One should avoid speaking harsh words, back biting, lying & use of untimely words.

देहप्रवृत्तिर्वा काचिद्विद्यते परपीडया । स्त्रीभोगस्तेयहिंसाद्या तस्यावेगान्विधारयेत्।।(च.सू.५/२९)

The action of violence against others, desire for other women & stealing should be controlled.

All these aspects mentioned under suppressible urges aim towards mental harmony. *Lord Buddha* considers desire as the route cause for unhappiness. These mental faculties are considered as 6 enemies in the path of *yogi*. *Ariṣadvarga* ie desire (*Kāma*), anger (*Krodha*), greed (*Lobha*), attachment (*moha*), ego (*mada*), & jelousy (*matsara*). One who conquers these will be happy. One who fails to do it will always be unhappy & will be afflicted with many diseases. *Caraka* considers grief as aggravating factor of diseases, worry as emaciating, Detatchment among nourishing, Greed as prime factor responsible for trouble in 25th chapter.

विषादो रोगवर्धनानां । शोकः शोषणानां । निवृत्तिः पुष्टिकराणां लौल्यं क्लेशकराणां ।।

(च.सू.२५/४०)

So these show the importance of suppression of suppressible urges. Similar things have been mentioned under *yama* & *niyama* in *yoga*.

Chapter- 5

NON SUPPRESSIBLE URGES

Urges are produced due to the action of *vāta*, suppression of urges leads to vitiation of *vāta* and many kinds of diseases categorized under *udāvarta* according to *Suśruta*.

वातविण्मूत्रजृम्भाश्रुक्षवोद्गार वमेन्द्रियैः । वाहन्यमानैरुदितैरुदावर्तो निरुच्यते ।। (सु.उ.३५/४)
क्षुत्तृष्णाश्वासन्द्रिणां उदावर्तो विधारणात् ।

By suppression of urges of flatus, faeces, urine, yawning, tear, eructation, vomiting & semen, the *vāta* moves in the upward direction & produces *udāvarta*, suppression of hunger, thirst, dyspnoea & sleep also produce *udāvarta*.

अश्रुजृम्भादिवेगरोधात् कोष्ठगतो वायुर्यदा भवति तदाऽपान प्रकोपादुदावर्त संभवः ।।

(डल्हण on सु.उ. ५५/४)

By suppression of urges for tear, yawning etc *vāyu* in *koṣṭha* (abdomen) gets vitiated & vitiates the *Apāna vāyu* & produces *udāvarta*.

Ācārya Vāgbhaṭa suggests non-suppression of natural urges as one of the measures of prevention, in *Rogānutpādanīya* chapter. Hemādri elaborating on it, mentions that without giving importance for time at any time these can be evacuated.

इह अनियतकालः। स च पञ्चधा-वेगधारणं, वेगोदीरणं, शोधनं, बृंहणं, भूताद्यस्पर्शनं चेति ।।

(अ.र.अ. हृ.सू ४/१)

Five preventive meusures like suppression of natural urges, forceful action of unmanifested urge, purification, nourishing & touch by *bhūtādi* factors should be done irrespective of time, so only it is said in other context.

रोगाः सर्वेऽपि जायन्ते वेगोदीरणधारणैः ।। (अ.हृ.सू. ४/२३)

Always the diseases are produced due to the forceful creation of unmanifested urge & suppression of manifested urge.

वेगान्न धारयेद्वातविण्मूत्रक्षवतृट्क्षुधाम्। निद्राकासश्रमश्वासजृम्भाश्रुछर्दिरेतसाम्।।(अ.हृ.सू.४/१)

One should not suppress the natural urges of flatus (*vāta*), defecation, micturation, sneezing, thirst, hunger, sleep, cough, dyspnoea due to tiredness, yawning, tears, vomiting & semen.

Caraka includes eructation (*udgāra*) & includes cough (*Kāsa*) in non suppressible urges.

Urge of micturation

बस्तिमेहनयोः शूलं मूत्रकृच्छ्रं शिरोरुजा । विनामो वंक्षणानाहः स्याल्लिङ्गं मूत्रनिग्रहे ।।
स्वेदावगाहनाभ्यङ्गान् सर्पिषश्चावपीडकम्। मूत्रे प्रतिहते कुर्यात्रिविधं बस्तिकर्म च।।(च.सू.७/६-७)

Pain in the bladder, genitals, difficulty in micturation, head ache, bending of body and distension in lower abdomen are the features of suppression of urge for micturation.

Vāgbhaṭa includes few more points in clinical features like body pain, urinary stones, and diseases mentioned under suppression of faeces & flatus. *Varti* (wick) made of *madana phala* is adviced by *vāgbhaṭa*.

Treatment– *Avagāha* type of *sveda* (tub bath), oil massage, instilling ghee in the nostrils & three types of *basti* ie *Niruha*, *anuvāsana* & *uttara basti* are the treatment.

Micturation

Bladder smooth muscles have some inharent contractile ability. Its nerve supply is intact. Stretch receptors in the bladder wall initiate reflex contraction, that has a lower threshold than intact contractile response of the muscle. Fibers in pelvic nerves are afferent limb of voiding reflex & parasympathetic fibers to bladder constitute efferent limb.

Urge of Defecation

पक्वाशयशिरःशूलं वातवर्चोऽप्रवर्तनम्। पिण्डिकोद्वेष्टनाध्मानं पुरीषे स्याद्विधारिते।। (च.सू.७/१८)

Colicy pain, head ache, retention of flatus & faeces, pain in the calf muscles & distension of abdomen are the features of suppression of defecation urge.

Vāgbhaṭa includes rhinitis (*pratiśyāya*), cutting pain, obstruction to heart, faeces expelled through mouth & diseases mentioned in suppression of flatus.

Defecation reflex

Distension of rectum with faeces initiates reflex contractions of its musculature & desire to defecate. The sympathetic nerve supply to internal (involuntary) sphincter is excitatory, where as parasympathetic supply is inhibitory.

- Pudendal nerve
- Spinal reflex that can be inhibited voluntarily, by keeping external sphincture contrated.

Treatment

स्वेदाभ्यङ्गावगाहश्च वर्तयो बस्तिकर्म च । हितं प्रतिहते वर्चस्यन्नपानं प्रमाथि च ।। (च.सू.७/९)

Foementation, massage, tub bath, *varti*, enema (*basti*) & foods & drinks having laxative nature are conducive in suppression of defecation urge.

Urge of Flatus

सङ्गो विण्मूत्रवातानामाध्मानं वेदना क्लमः । जठरे वातजाश्चान्ये रोगाः स्युर्वातनिग्रहात् ।। (च.सू.७/१२)

Retention of faeces, urine & flatus, distension of abdomen, pain, tiredness and other diseases of abdomen due to vitiation of *vāta* are the features of suppression of *vāta*.

Suśruta mentions diseases like obstruction to heart, dyspnoea, hiccough, cough, rhinitis, throat obstruction, diseases of *kapha*, *pitta* & expulsion of faeces through mouth.

आध्मानशूलौहृदयोपरोधं शिरोरुजं श्वासमतीव हिक्काम् ।
कासप्रतिश्यायगलग्रहांश्च बलासपित्तप्रसरं च घोरम् ।।
कुर्यादपानोऽभिहतः स्वमार्गे हन्यात् पुरीषं मुखतः क्षिपेद्वा ।। (सु.उ.५५/७-८)

Vāgbhaṭa mentions abdominal tumor (*Gulma*), *udāvarta*, destruction of vision & *Agni* & cardiac disorders.

Treatment

स्नेहस्वेदविधिस्तत्र वर्तयो भोजनानि च। पानानि बस्तयश्चैव शस्तं वातानुलोमनम्।। (च.सू.७/१३)

Oleation, foementation, suppositories *phala varti*, food & drink alleviating *vāta* & enema (*basti*) are indicated.

Urge of vomiting

कण्डूकोठारुचिव्यङ्गशोथपाण्ड्वामयाज्वराः । कुष्ठहृल्लासवीसर्पश्छर्दिनिग्रहजा गदाः।।(च.सू.७/१४)

Itching, urticaria, anorexia, blackish pigmentation, swelling, anemia, fever, skin disease, nausea & *visarpa* a variety of skin disease are produced by suppression of urge of vomiting.

Vāgbhaṭa mentions itching in eyes, cough, & dyspnoea along with other symptoms.

Vomiting

Visceral reflex integrated in the medulla, initiate vomiting. Vomiting starts with salivation & sensation of nausea. Impulses

are relayed from mucosa to medulla, over visceral afferent pathways in sympathetic nerves & vagi.

Treatment

भुक्त्वा प्रच्छर्दनं धूमो लङ्घनं रक्तमोक्षणम् । रूक्षान्नपानं व्यायामो विरेकश्चात्र शस्यते ।। (च.सू.७/१५)

Emesis after intake of food, smoking, fasting, blood letting intake of dry food, exercise & purgation are indicated here.

Vāgbhaṭa indicates gargling (*guṇḍūṣa*) & massage, along with alkali & salt intake.

Urge of sneezing

मन्यास्तम्भः शिरःशूलमर्दितार्धावभेदकौ । इन्द्रियाणां च दौर्बल्यं क्षवथोः स्याद्विधारणात् ।।
(च.सू.७/१६)

Stiffness of neck, head ache, facial paralysis, half sided head ache, weakness in sense organs & weakness are produced due to suppression of sneezing reflex.

Sneeze Reflex

Irritation in the nasal passage ways, trigger the afferent impulses through 5th cranial nerve to medulla from where reflex is triggered. Series of reactions similar to cough reflex takes but uvula is depressed, so that large amount of air passes rapidly through nose, thus helps to clear the nasal passages of foreign matter.

Treatment

तत्रोर्ध्वजत्रुकेऽभ्यङ्गः स्वेदो धूमः सनावनः। हितं वातघ्नमाद्यं च घृतं चौत्तरभक्तिकम्।। (च.सू.७/१७)

Massage, foementation, smoking & nasal drops are indicated. One should take ghee which is having *vāta* alleviating nature after meals.

Vāgbhaṭa advices collyrium & watching of sun along with the above said measures.

Urge of eructation–

हिक्का श्वासोऽरुचिः कम्पो विबन्धो हृदयोरसोः। उद्गारनिग्रहात्तत्र हिक्कायास्तुल्यमौषधम्।।(च.सू.७/१८)

Hiccough, dyspnoea, anorexia, tremors & obstruction of heart are the features of suppression of eructation & treatment is same as Hiccough. According to *Vāgbhaṭa* distension of abdomen is also present.

Urge of yawning

विनामाक्षेपसंकोचाः सुप्तिः कम्पः प्रवेपनम्। जृम्भाया निग्रहस्तत्र सर्वं वातघ्नमौषधम्।।(च.सू.७/१९)

Bending of the body, convulsion, contraction, numbness, tremors & shaking of the body are the features of suppression of yawning & treatment is administration of vāta alleviating drugs.

According to *Suśruta* stiffness of neck and diseases of throat, head, ear, nose & eyes are produced due to suppression of yawning.

Urge of Hunger

कार्श्यदौर्बल्यवैवर्ण्यमङ्गमर्दोऽरुचिर्भ्रमः। क्षुद्वेगनिग्रहस्तत्र स्निग्धोष्णं लघु भोजनम्।। (च.सू.७/२०)

Emaciation, weakness, discolouration, body ache, anorexia & giddiness are the features of suppression of hunger & they should be treated with unctous, hot & light food.

According to *Suśruta,* drowsiness (*Tandrā*) includes along with other features.

Hunger

Appetite centre in the hypothalanus is responsible for the onset of hunger. Suppression of hunger leads to hunger contractions.

Urge of Thirst

कण्ठास्यशोषो बाधिर्यं श्रमः सादो हृदि व्यथा। पिपासानिग्रहात्तत्र शीतं तर्पणमिष्यते।। (च.सू.७/२१)

Dryness of throat & mouth, deafness, tiredness, exhaustion, weakness & cardiac pain are the features of suppression of thirst reflex & should be treated with cold & nourishing drinks.

Thirst

Hypothalamus control of the thirst is regulated by plasma osmolality & extra cellular fluid. Renin secretion increases, inturn–angiotensin II also increases subfornica organ induces thirst.

Urge of Lacrymation

प्रतिश्यायोऽक्षिरोगश्च हृद्रोगश्चारुचिर्भ्रमः। बाष्पनिग्रहणात्तत्र स्वप्नो मद्यं प्रियाः कथाः।। (च.सु.७/२२)

Rhinitis, eye disease, cardiac diseases, anorexia & giddiness are the features of suppression of lacrymation, condition should be treated with sleep, intake of wine & pleasent stories.

Urge of sleeping

जृम्भाङ्गमर्दस्तन्द्रा च शिरोरोगोऽक्षिगौरवम्। निद्राविधारणात्तत्र स्वप्नसंवाहनानि च।। (च.सू.७/२३)

Yawning, body ache, disease of head and heaviness of eyes are the features of suppressions of sleep. The condition should be treated with sleep & massage of the body.

Sleep Reflex

Reticular activating system and other parts of the brain are fatigued, over the period of waking day. So they become inactive and produce sleep. Another theory suggests, some centres located below mid pontile level of brain stem, inhibit the activity of other parts of the brain and produce sleep.

Diencephalic sleep zone, basal fore brain sleep zone, parts of hypothalamus and suprachiasmatic nuclei are responsible for production of sleep. The production of sleep follows circadian rythm.

Urge of breathing

गुल्महृद्रोग संमोहाः श्रमनिःश्वासधारणात् । जायन्ते तत्र विश्रामो वातघ्नश्च क्रियाः हिताः ।।

Abdominal tumour, heart diseases and fainting are the features of suppression of diseases due to tiredness. It should be treated with *vāta* alleviating treatment & rest.

Urge of seminal ejaculation

मेढ्रे वृषणयोः शूलमङ्गमर्दो हृदि व्यथा । भवेत् प्रतिहते शुक्रे विबद्धं मूत्रमेव च ।। (च.सू.७/१०)

Pain in the genitals, testicles, body pain, pain in cardiac region & retention of urine are the features of suppression of urge of seminal discharge.

शुक्रात्तत्स्रवणं गुह्यवेदनाश्वयथुज्वराः। हृद्व्यथा मूत्रसङ्गाङ्गभङ्गवृद्ध्यश्मषण्ढताः ।। (अ.हृ.४/१९)

Pain in the genitals, swelling, fever, pain in cardiac region, retention of urine, body pain, hernia (*vṛddhi*), stones & impotency are features of suppression of seminal discharge.

Treatment

तत्राभ्यङ्गोऽवगाहश्च मदिरा चरणायुधाः। शालिः पयो निरुहश्च शस्तं मैथुनमेव च।। (च.सू.७/११)

Diseases due to suppression of seminal discharge should be treated with massage, tub bath (*Avagāha sveda*), wine, chicken, rice, milk, enema (*Niruha basti*) & sexual interurse.

Ejaculation– Touch receptor present in glans penis that reach spinal cord through internal pudendal nerves. Emission is sympathetic response integrated in upper lumbar segments of spinal cord & effected by contraction of the smooth muscle of vasa deferentia & seminal vesicles in response to hypogastric nerves.

Upavāsa (Fasting)

It is one of the types of *laṅghana*.

यत्किंचित् लाघवकरं देहे तत् लङ्घनं स्मृतम् ।। (च.सू. २२/९)

The procedure which makes the body light is *langhana.*

चतुप्रकारा संशुद्धिः पिपासा मरुतातपौ । पाचनान्युपवासश्च व्यायामश्चेति लङ्घनम् ।। (च.सू.२२१८)

Four types of purificatory measures, thirst, exposure to wind, sunlight, drugs which help in digestion, fasting & exercise are different types of *laṅghana.*

Benifits of fasting

पुण्यप्रदो ह्यामदोषहरोऽनलकरः सदा । स्फूर्तिदश्चोपवासो वै इन्द्रियाणां प्रसादकः ।।
प्रायो व्रतोपावसो हि विधेयः शास्त्रसम्मतः। धर्मः स्वास्थ्यं च लभ्येत वयःस्थौ सुविचारिभिः ।।

(स्व.वृ.स.)

Fasting is auspicious, cures *āmadoṣa*, enhances *Agni*, gives enthusiasm, clearity of sense organs & fasting is pious rule according to texts. It enhances virtuousness, health, life span & good thoughts.

Types of Fasting

- *Nirāhāra* – without taking any food
- *Phalāhāra* – with fruits

Nirahāra
- *Sajala* with water
- *Nirjala* without consumption of water

One should consider his prakṛti before fasting.

Method of breaking fast

कृत्वाशौचादिकं प्रातः लघु भुञ्जीत भोजनम् । स्निग्ध सुमधुरं रुच्यं मृद्वन्नं साधु साधितम् ।।

(स्व.वृ.स.)

Next day of fast one should evacuate bowels & bladder & consume unctous, sweet, tasty, soft & *sātvika* food.

Persons unfit for fasting

अहिताग्निरङ्वाश्च ब्रह्मचारी च ते त्रयः । अश्नन्त एवं शोभान्ते नैषां सिद्धिरनश्नताम् ।। (स्मृति)

One who does sacrifices (*Agni hotri*), wrestler & student should not fast.

Indications of fasting

त्वग्दोषिणां प्रमीढानां स्निग्धाभिष्यन्दिबृंहिणाम् । शिशिरे लङ्घनं शक्तमपि वातविकारिणाम्।।

(च.सू.२२/२९)

Laṅghana therapy is administered during the *śiśira ṛtu* to the patients suffering from skin diseases, urinary disorders, obesity and even *vāta* disorders.

Chapter- 6

UNDESIRABLE AND DESIRABLE CONSTITUTIONS

इह खलु शरीरमधिकृत्याष्टौ पुरूषा: निन्दिता भवन्ति । तद्यथा—अतिदीर्घश्च, अतिह्रस्वश्च, अतिलोमा च, अलोमा च, अतिकृष्णश्च, अतिगौरश्च, अतिस्थूलश्च अतिकृशश्चेति।।(च.सू.२१/३)

Depending on the physical appearance, there are 8 types of undesirable (निन्दित पुरुष) persons- too tall, too short, too hairy, hair-less, too dark, too white, too fat and too lean (emaciated).

Obesity

अतिस्थूलस्य तावदायुषो ह्रास: जवोपरोध: कृच्छ्रव्यवायत दौर्बल्यं दौर्गन्ध्यं स्वेदाबाध: क्षुधतिमात्रं पिपासा अतियोगश्चेति भवन्त्यष्टौ दोषा: । (च.सू. २१/४)

The obese persons have eight defects inharent to them. They are deficient in longevity, slow in movement, difficulty in sexual intercourse, weakness, bad smell, excessive sweating, excessive hunger and thirst.

Aetiology

तदतिस्थौल्यादतिसंपूरणात् गुरु मधुर शीतस्निग्धोपयोगात् अव्यायामात् अव्यवायात् दिवास्वप्नात् घर्षनित्यत्वात् अचिन्तनात् बीजस्वभावात् चोपजायते ।। (च.सू. २१/१४)

अतिसंपुरणात्-अतिभोजनं, बीजस्वभावादिति स्थूलमातापितृजन्यत्वात्। (च.पा.onच.सू.२१/५)

Obesity is caused by over intake, intake of heavy, sweet, unc-tuous food, no physical exercise, abstinence from sexual indulgence, day sleep, cheerfulness, lack of worries & heredity.

Problems associated with obesity

Reduced life expectancy

आयुषो ह्रास: विषमधातुत्वात् तस्य ह्यतिमात्र मेदस्विनो मेद एवोपचीयते न तथेतरे धावत: तस्मादायुषो ह्रास: । (च.सू. २१/४)

In the obese only fat (*medas*) is nourished but not the other *dhātus*. This leads to reduced longevity.

Slowness in movements

जवोपरोध-शैथिल्यात् सौकुमार्यात् गुरुत्वात् च मेदसो जवोपरोध: ।

Due to improper *dhātus* loseness and tenderness are produced & excessive fat makes heavyness. So these make the movements slow.

Difficulty in sexual act

शुक्राबहुत्वात् मेदसाऽऽवृत मार्गत्वात् च कृच्छ्रव्यवायता । मेदो एवोपचीयते न तथेतरे धातवः–शुक्रक्षय ।। (च.सू. २१/४)

As only *medas* is nourished & other *dhātus* are not nourished. So there is reduced formation of semen (*śukra*), this causes obstruction in the channels transporting *śukra*, which produce difficulty in sexual act.

Weakness

गुर्वादिवृद्धसंलीनश्लेष्ममिश्रो अन्नजो रसः आम एवं श्लथीकुर्वन् धातून् स्थौल्यमुपानयेत् ।। दौर्बल्यमसमत्वधातूनां । (अ.सं.सू. २४/२२)

Equilbrium of *dhātus* is disturbed, due to this there is weakness

Bad odour

दौर्गन्ध्यं मेदोदोषान्मेदसः स्वभावात् स्वेदनत्वाच्च । (च.सू. २१/४) मेदसः मलः स्वेदः ।

Excessive fat produces excessive excreta ie sweat and inharent nature of fat & sweat are bad odour.

Excessive sweat

मेदसः श्लेष्मसंसर्गात् विष्यन्दित्वात् बहुत्वात् गुरुत्वात् व्यायामासहत्वात् स्वेदाबाधः ।।
(च.सू. २१/४)

Fat is associated with *kapha*. It is fluid, heavy & increased in quantity. He can not withstand exercise which brings about excessive sweating.

Excessive hunger & thirst

तीक्ष्णाग्नित्वात् प्रभूत कोष्ठवायुत्वाच्च क्षुधतिमात्रं पिपासातियोगश्चेति । (च.सू. २१/४)

Due to the increased *agni* & *samāna vāyu* the obese suffers from excessive thirst & hunger.

Pathogenesis of obesity

मेदसावृतमार्गत्वात् वायुः कोष्ठे विशेषतः । चरन् संधूक्षयत्यग्निमाहारं शोषयत्यपि ।।
तस्मात् स शीघ्रं जरयत्याहारं चातिकांक्षति। विकारांश्चाश्नुते घोरान् कांश्चित् काल व्यतिक्रमात् ।।
एतावुपद्रवकरौ विशेषादग्निमारुतौ । एतौ हि दहतः स्थूलं वनदावो वनं यथा ।।
मेदस्यतीव संवृद्धे सहसैवानिलादयः। विकारान् दारुणान् कृत्वा नाशयन्त्याशु जीवितम् ।।
(च.सू.२१/५-९)

The excessive fat in the body produces obstruction. So the movement of *vāyu* is specially restricted to *koṣṭha* (abdomen), this stimulates the digestive power & food taken gets digested quickly & assimilated very fast, so he eats more.

Agni & *vāta* are two most trouble some factors. They burn the obese like the forest fire burns the forest. Excessive fat produce

severe types of diseases all of a sudden by *vāta* etc factors, which may lead to instantaneous death.

Features of Obese

मेदोमांसातिवृद्धत्वाच्चलस्फिगुदरस्तनः । अयथोपचायोत्साहो नरोऽतिस्थूल उच्यते ।।(च.सू.२१/९)

Due to excessive fat & muscle tissues, buttock, abdomen and breast become pendulous. His strength is disproportionate with the physical growth.

Disadvantages of obese

सततं व्याधितवेतावतिस्थूलकृशौ नरौ । सततं चोपचर्यौ हि कर्शनैर्बृंहणैरपि ।।
स्थौल्य कार्श्ये वरं कार्श्यं समोपकरणौ हि तौ । यद्युभौ व्याधिरागच्छेत् स्थूलमेवातिपीडयेत् ।।
(च.सू.२१/१६-१७)

स्थूलस्य दुरुपक्रमत्वात् स्थूलमेवातिपीडयेत् । यतः स्थूलस्य सन्तर्पणमतिस्थौल्यकरम् ।।
अपतर्पणं चायं प्रवृद्धाग्नित्वात् न सोढुं क्षमः । (च.पा.)

Both obese and emaciated persons always suffer from diseases, they are treated by depleting therapy and nourishing theropy. Among the two, emaciated is better, because treatment of obese is difficult, as nourishing therapy increases obesity. He cannot be treated by fasting therapy because due to excess of *Agni*, he cannot with stand fasting (*Laṅghana*).

Treatment Principle

गुरु चापतर्पणं चेष्टं स्थूलानां कर्शणं प्रति ।। (च.सू. २१/२०)

१. गुरु चापतर्पणं च यथा-मधु-एतद्धि गुरुत्वात् अग्निं यापयति अपतर्पणत्वात् मेदो हन्ति
२. प्रशातिका प्रभृतीनां अपतर्पणानां संस्कारादिना गुरुत्वं कृत्वा भोजनं देयं । (च.पा.)

Heavy & non nourishing diet is given to make obese slim. Ex. *Madhu*–due to heavy quality it pacifies increased *Agni*, due to non nourishing nature, it reduces fat. *Praśātika & Priyaṅgu* etc are made heavy by processing & given.

कार्श्यमेववरं स्थौल्यात् न हि स्थूलस्य भेषजम् ।। (अ.हृ.सू. १४/३१)
मेदोनिलश्लेष्मनाशनं सर्वमिष्यते ।। (अ.हृ..सू. १/१)
अत्र प्रधानोपक्रमः स्वेदः न स्वेदयेत् अतिस्थूलस्य

According to *Aṣṭāṅga hṛdaya* also, emaciation is better than obesity. The drugs having *kapha, vata* and *medohara* properties are used in the treatment of obesity. *Svedana* which is ideal in *kapha* disorders cannot be used in obese.

Management of obesity

१. वातघ्यान्नपानानि श्लेष्ममेदोहराणि च । रूक्षोष्णा बस्तयस्तीक्ष्णा रूक्षाण्युद्वर्तनानि च ।।(च.सू.२१/२१)

(1) Diets having the property of *vāta* alleviation & *kapha, meda* alleviation should be given along with enema of hot, sharp, dry

drugs & dry massage (*udvartana*) with dry powders are indicated in obesity.

२. गुडूची भद्रमुस्तानां प्रयोगस्त्रैफलास्तथा। तक्रारिष्ट प्रयोगश्च प्रयोगो माक्षिकस्य च ।।(च.सू.२१/२२)

Intake of Tinospora cardifolia miers, Cyperus rotundus linn, Terminalia chebula linn, Terminalia belerica roxb, Emblica officinalis Gaertn, *Takrāriṣṭa* & honey are also indicated.

३. विडङ्ग नागरं क्षारः काललोह रजोमधुः। यवामलकचूर्णं च प्रयोगः श्रेष्ठ उच्यते ।।(च.सू.२१/२२)

Intake of Embelia ribes Burm f., Zingeber officinale Rose, *yavakṣāra*, black iron powder, powder of Hordeum vulgare linn and Emblica officinalis Gaertn along with honey is adviced.

बिल्वादि पञ्चमूलस्य प्रयोगः क्षौद्रसंयुतः। शिलाजतु प्रयोगश्च साग्निमन्थ रसः परः।।(च.सू.२१/२३)

Bṛihat Pañcamūla with honey, *Śilājatu* with decoction of *Agnimantha* is indicated in obesity.

५. प्रशातिका प्रियङ्गुश्च श्यामाक यवका यवाः । जूर्णाह्वा कोद्रवा मुद्गाः कुलत्थाश्चक्रमुद्गकाः। आढकीनां चबीजानि पटोलामलकैः सह । भोजनार्थं प्रयोज्यानि पानं चानु मधूदकं ।।
(च.सू.२१/२५-२६)

Following food products should be used in obesity.

Praśātika/Kaṅgu Setaria italika Beauv (Italian millet),

Priyangu (Aglaia roxburghiana),

Śyāmāka (Echinochloa feumentacea Linn.),

Yava (Hordeum vulgare Linn.),

Jūrṇāhva (Sorgham vulgare Pers),

Kodrava (Paspalum scrobiculatum Linn.) Kodo millet,

Mudga (Phaseolus radiatus Linn.) green gram,

Kulattha (Dolicus biflorus) (horse gram), *Cakramudgaka or ṛṣimudgaka* (?),

Āḍhaki (Cajanus cajan Millsp) (Redgram) along with

Paṭola (Trichosanthes cucumerina Linn.) & *Āmalaki* Emblica officinalis Gaertn (goose berry). Honey water is conducive to obese.

६. अरिष्टानां चानुपानार्थे मेदोमांसकफापहान् । अतिस्थौल्य विनाशाय संविभज्य प्रयोजयेत् ।। प्रजागरं व्यवायं च व्यायामं चिन्तनानि च । स्थौल्यमिच्छन् परित्यक्तुं क्रमेणाभिप्रवर्धयेत् ।।
(च.सू.२१/२७-२८)

Ariṣṭās in the form of adjuvents reduce fat, flesh & *kapha*. When above said drugs are used, they reduce obesity.

Regimens like awakening at night, sexual indulgence, exercise & worries help in reducing obesity.

Emaciation

Aetiology

सेवा रूक्षान्न पानानां लङ्घनं प्रमिताशनम् । क्रियातियोगः शोकश्च वेगनिद्राविनिग्रहः ।।
रूक्षस्योद्वर्तनं स्नानस्याभ्यासः प्रकृतिर्जरा । विकारानुशयः क्रोधः कुर्वन्त्यति कृशं नरम्।।
(च.सू.२१/१०-११)

प्रमितस्य स्तोकस्याशनं प्रमिताशनम् । क्रियातियोगः वमनाद्यति योगः ।।
प्रकृतिः देहजनकं बीजं । अनुशयः अनुबन्धः ।। (च.पा.)

In take of ununctous diets & drinks, fasting, intake of inadequate quantity of food, excess of elimination therapies, suppression of natural urges including urge for sleep, dry massage (*udvartana*), bath, heredity, long standing illness, old age and anger make a man emaciated.

व्यायाममतिसौहित्यं क्षुत्पिपासामयौषधम् । कृशो न सहते तद्वत् अतिशीतोष्णमैथुनम् ।।
प्लीहा कासः क्षयः श्वासो गुल्मोऽर्शास्युदराणि च ।
कृशं प्रायोऽभिधावन्ति रोगाश्च ग्रहणी गताः ।। (च.सू. २१/१३-१४)

He cannot with stand physical exercise, intake of large quantity of food, hunger, thirst, diseases & drugs. They also cannot with stand excessive cold, heat & sexual acts. They suffer from splenomegaly, cough, dyspnoea, emaciation, abdominal tumor, piles, ascites & sprue.

Feature of emaciation

शुष्कस्फिगुदरग्रीवो धमनीजालसन्ततः त्वगस्थिशोषोऽतिकृशः स्थूलपर्वा नरो मतः।।(च.सू.२१/१५)

Buttocks, abdomen and neck are emaciated, veins can be seen easily through skin, joints are prominently seen, man appears to have only skin & bone.

Principles of treatment

कृशानां बृंहणार्थं च लघु संतर्पणं च यत् ।। (च.सू. २१/२०)
लाघवादग्नि वृद्धिकरं, संतर्पणत्वाच्च पुष्टिकृत् ।।
नवान्नादि गुर्वपि संतर्पणं कर्तव्यं । परं लाघवं गौरवं संस्कारादिना प्रकर्तव्यम् ।। (च.पा.)

Light & nourishing diet should be given for very lean person to make him fat. Light diet helps to increase *Agni, santarpaka* food nourishes the body. Ex. Newly harvested rice, heaviness reduced by means of processing.

Management of emaciation

१. स्वप्नो हर्षः सुखा शय्या निर्वृतिः शमः । चिन्ता व्यावाय व्यायाम विरामः प्रियदर्शनः ।।
(च.सू.२१/२९)

Regimen– Sleep, happiness, comfortable bed, satisfaction, peaceful mind, no worries, sexual act, exercise & pleasent sights are conducive for emaciated person.

२. नवान्नानि नवं मद्यं ग्राम्यानूपौदकाः रसाः । संस्कृतानि च मांसानि दधि सर्पिः पयांसि च ।।
(च.सू.२१/३०)

Foods– Newly harvested rice, newly prepared alcohol, flesh of marshy & aquatic animals, processed meat, curds, ghee, milk, sugar cane, black gram, wheat & products made of jaggery are indicated in emaciated persons.

३. बस्तयः स्निग्धमधुरस्तैलाभ्यङ्गश्च सर्वदा । शुक्लं वासो यथाकालं दोषाणामवसेचनम् ।।
रसायनानां वृष्याणां योगानामुपसेवनं । हत्वाति कार्श्यमाधत्ते नृणामुपचयं परं ।।
(च.सू.२१/३१-३२)

Intake of nourishing diet, freedom from anxiety and good sleep make the man fat like a well nourished pig.

Enema prepared of unctous and sweet drugs, regular oilmassage, bath, scents, garlands, use of white cloths, elimination of *doṣās* in time and administration of rejuvenating and aphrodiasac drugs cure emaciation.

Desirable Constitution (अनिन्दित पुरुष)

सममांसप्रमाणस्तु समसंहननो नरः । दृढेन्द्रिय विकाराणां न बलेनाभिभूयते ।।
क्षुत् पिपासातपसहः शीत व्यायाम संसहः। समपक्तासमजरः सम मांसचयो मतः।।(च.सू.२१/१८-१९)

Person endowed with well formed muscles, compactness and strong sense organs will not be afflicted with strong diseases. He can with stand hunger, thirst, heat, cold & exercise. The food gets digested & gets assimilated properly, resulting in proper nourishment of *māṁsa* and all *dhātu.*

समधातुत्वात् मध्यशरीरोभवति सर्वक्रियासु समर्थः क्षुत् पिपासशीतोष्णवातवर्षातपसहो बलवांश्च स सततमनुपालयितव्य इति ।। (सुसू. १५/३४)
श्रेष्ठो मध्यशरीरस्तु कृशः स्थूलात्तु पूजितः ।

As the *dhātus* are in equilibrium, the persons having medium frame are able to perform all kinds of actions. They can with stand hunger, thirst, heat, cold, rains, intense sunlight & endowed with strength. This condition has to be maintained always. Always medium frame of body is superior than obese & emaciated body.

Chapter- 7
INTELLECTUAL ERRORS

Aim of *Āyurveda* is attainment of health & through this the ultimate happiness the salvation. So for this one has to avoid the causes for the diseases.

धीधृतिस्मृतिविभ्रंशः संप्राप्तिः कालकर्मणाम् । असात्म्यार्थागमश्चेति ज्ञातव्या दुःखहेतवः ।।

(च.शा. १/९८)

Impairment in intellect, courage, memory power, time factor action & unwholesome contact with sense objects are the causes for unhappiness ie disease.

Definition

धीधृतिस्मृतिविभ्रष्टः कर्म यत् कुरुतेऽशुभम्। प्रज्ञापराधं तं विद्यात् सर्वदोष प्रकोपणः।।(च.शा. १/१०२)

The person who performs actions, which are harmful to the body with impaired intellect, patience & memory is known as intellectual error, which leads to aggravation of all *doṣas*.

Features of impaired intellect

विषमाभिनिवेशो यो नित्यानित्ये हिताहिते । ज्ञेयः स बुद्धिविभ्रंशः समं बुद्धिर्हि पश्यति ।।

(च.शा. १/९९)

If one considers harmful as conducive thing, conducive thing as harmful, eternal as noneternal & vise versa is considered as impairment of intellect.

Impairment of sustenance

विषय प्रवणं सत्वं धृतिभ्रंशान्न शक्यते। नियन्तुमहितादर्थाद्धृतिर्हि नियमात्मिका।।(च.शा. १/१००)

The weak mind which is oriented towards worldly enjoyment & person indulges into the acts, which are harmful to the body is known as impairment of (*dhṛti*) sustenance.

Impairment of memory

तत्वज्ञाने स्मृतिर्यस्य रजोमोहावृतात्मनः। भ्रश्यते स स्मृतिभ्रंशः स्मर्तव्यं हि स्मृतौ स्थितम् ।।

(च.शा. १/१०२)

The memory of the person will be effected by *Rajas* & *Tamas*. This condition is known as (*smṛti bhraṁśa*) impairment of memory.

Intellectual errors (प्रज्ञापराध)

उदीरणं गतिमतामुदीर्णानां च निग्रहः। सेवनं साहसानां च नारीणां चातिसेवनम्।। (च.शा.१/१०३)

Forceful creation of urges, supression of manifested urges, indulging in activities where more strength is needed than ones capacity & excessive sexual act are considered under intellectual errors.

कर्मकालातिपातश्च मिथ्यारम्भश्च कर्मणाम् । विनयाचारलोपश्च पूज्यनां चाभिघर्षणम् ।।
ज्ञातानां स्वयमर्थानामहितानां निषेवणम् । परमौन्मादिकानां च प्रत्ययानां निषेवणम् ।।
अकालदेशसंचारौ मैत्री संक्लिष्टकर्मभिः । इन्द्रियोप क्रमोक्तस्य सद्वृत्तस्य च वर्जनम् ।।
ईर्ष्यामानभयक्रोधलोभमोहमदभ्रमाः । तज्जं वा कर्म यत् क्लिष्टं क्लिष्टं यद्देह कर्म च ।।
यच्चान्यदीदृशं कर्म रजोमोहसमुत्थितम् । प्रज्ञापराधं तं शिष्ठा ब्रुवते व्याधिकारणम् ।।
(च.शा. १/१०४-१०८)

Not treating the disease at proper time, improper treatment ie purificatory processes, *atiyoga, mithyāyoga*, not obeying the codes of conducts with respect to *sadvṛtta,* disrespecting elders, enjoyment of harmful objects, indulging into factors which lead to madness, moving in the restricted area in unduely time, friendship with person indulging in bad deeds, not following rules mentioned in *sad vṛtta*, one who acts by the jelousy, disrespect, fear, anger, greed, ignorance, intoxication & improper knowledge, actions which are unhealthy to the body & actions with *rajas & tamas* on predominance are considered under intellectual errors.

Status of mind during intellectual errors

बुद्ध्या विषम विज्ञानं विषमं च प्रवर्तनम्। प्रज्ञापराधं जानीयान्मनसो गोचरं हि तत्।।(च.शा.१/१०९)

Improper perception of knowledge by intellect & indulging in improper acts, acts by the unhealthy state of mind, mainly by *rajas & tamas* leads to intellectual errors.

Unhealthy Measures

१. व्यायामहास्यभाष्याध्वग्राम्यधर्मप्रजागरान्। नोचितानपि सेवेत बुद्धिमानतिमात्रया।।(च.सू.७/३४)

One should not do excess of exercise, laughing, talking, walking, sexual act and night awakening even if one is accustomed to them.

एतानेवंविधाश्चन्यान् योऽतिमात्रं निषेवते। गजं सिंह इवाकर्षन् सहसा स विनश्यति।।(च.सू.७/३५)

One who indulges in such activities will be destroyed like the lion trying to drag the elephant.

२. कालबुद्धीन्द्रियार्थानां योगो मिथ्या न चाति च । द्वयाश्रयाणां व्याधीनां त्रिविधो हेतु संग्रहः ।।
(च.सू.१/५४)

The etiology for the diseases of body & mind are of three types ie wrong utilization, over utilization & non utilization of time, mental faculties & objects of sense organs.

Production of diseases due to wrong behavior (मिथ्या विहारणां रोगसमुद्भव)

मिथ्या अनुचित: विहार: कायवाऽङ्मनो व्यापार: ।। (डल्हण on सु.वि. १/४१)

Mithyā vihāra can be defined as the improper actions related to body, speech & mind.

मिथ्यायोगो व्याधिकराणां ।। (च.सू. २५/४०)

Improper utilization of senses is prime among the factors for production of diseases, on the basis of *Ḍalhaṇā's* quotations the wrong behavior or *mithya vihāra* can be classified into three types.

Mithyā-vihāra → *Kāya*
→ *Vāk*
→ *Manas*

Wrong behavior related to the body (Mithyā vihāra of Kāya)

१. रोगाध्वप्रमदामद्यव्यवायैश्चाति पीडितम् । ऋतुसात्म्यविपर्यासात् स्नेहादीनां च विभ्रमान् ।।
(च.पा. on च.चि. २९/१०)

हस्त्यश्वोष्ट्रगच्छता । हयोष्ट्रयानाम्बुक्रीडाप्लवनलङ्घनै: (च.चि. २९/९)

Disease, excessive walking, excessive sexual indulgence, excessive intake of alcohol, not following *Ṛtu caryā* properly, improper *svedana* therapy or pañcakarma therapy, travelling on elephant, horse, camel, swimming, jumping & fasting can be included under *mithyāvihāra* related to body.

विषमादुपचाराच्च दोषासृक्स्रावणादति । लङ्घन प्लावनात्यध्वव्यायामाति विचेष्टितै: ।।
वेगसंधारणादामादभिघातादभोजनात्। मर्मघाताद्गजोष्ट्राश्वशीघ्रयानापतंसनात्।।(च.चि.२८/१६-१७)

Improper treatment, *Rakta* mokṣaṇa (blood letting), fasting, jumping, walking, exercise, withholding of natural urges , injury, travelling over animals like elephant, camel, horse very fast are all wrong behaviors related to body. They vitiate *vāta* & produce different kinds of diseases.

Wrong behavior related to mind (Mithyā vihāra of Manas)

Wrong utilization of *manas* include actions like not following codes of conducts mentioned in *sadvṛtta*, insulting elders, teachers jealousy, anger, hatred etc which have an impact on mind.

Wrong behavior related to speach (Mithyā Vihāra of Vāk)

Abusing others, speaking in harsh ways, speaking lies, back biting, always blaming others, quarreling without obvious reasons etc come under improper action regarding speech. This again indirectly has an impact on mind, which intern effects the body & may lead to diseases.

Pathogenesis (Samprāpti)

Mithyā vihāra

- Kāya
  ↓
  Vegadhāraṇa, Ativyavāya, ativyā-yāma, madhya sevana, pañcakarma apacāra, Hasti, Aśva, uṣṭrayāna, plavana, laṅghana, Adhva, bhāra vahana.
  ↓
  Vitiation of vāta
  ↓
  vāta vyādhi, vāta rakta vegasandhāraṇa, janyavyādhi etc
- Manas
  ↓
  Rajas, Tamas guṇa
- Vāk
  ↓
  Vardhana along with vitiation of vāta
  - Manas Roga
    ↓
    Unmāda, Apasmāra, Grahabādha etc.
  - Śarīramānasa
    ↓
    Madhumeha, Hṛdroga, Uccha Rakta chāpa, Amla pitta etc.

Chapter- 8
FOOD HABITS

आह्रियते इति आहार: अन्नपानादि सर्व ।। (श.क.द्रु.)
आह्रियते जिह्वागलाधः क्रियते इत्याहारः ।। (ज.क.त.)

Āhāra is the food which is ingested, it includes all foods like eatables, lickables, drinkables etc. It is derived from root–

पु आङ + हृ + घञ्

Food has been given the prime importance since Vedic period. It is considered as *Brahma* in *Upaniśad. Kāśyapa* gives it the name *Mahābhaiśajya*. This is responsible for the growth, development and enhancement of ojas.

अन्नं ब्रह्मेति व्यजानात् अन्नाद्येव खल्विमानि भूतानि जायन्ते । अन्नेन जातानि जीवन्ति अन्नं प्रयन्त्यभि संविशतीति ।। (तैत्तिरीय उपनिषत्)

Food is supreme or *brahma*. All the beings originate from food, food is responisble for life of all beings. *Anna* is present in all living beings in the form of food sheath *Annamayakoṣa*.

आहार संभवं वस्तु रोगश्चाहार संभवः। हिताहित विशेषात्तु विशेषो सुखदुःखयोः।।(च.सू.२८/४५)

Caraka emphasises importance of food. The body as well as diseases are formed by food, wholesome & unwholesome food are responsible for happiness & misery respectively.

अन्नं वृत्तिकराणां श्रेष्ठः ।। (च.सू. २५/४०)

'Anna' or food is the best among things which sustain life.

विनापि भेषजं व्याधिः पथ्यादेव निवर्तते। न तु पथ्य विहीनस्य भेषजानां शतैरपि।।(प.अप.वि.१/६)

The disease can be cured without any medicine by just following wholesome regimen. Where as even hundreds of medicines cannot cure a disease in absence of wholesome regimen.

न च आहार समं किञ्चित् भैषज्यमुपलभ्यते। शक्यतेऽप्यन्नमात्रेण नरः कर्तुम् निरामयः।।
(का.सं.खि ४/५)

No medicine is equivalent to food. It is possible to make a person disease free with just proper diet.

आहारः प्रीणनो सद्यो बलकृद्देहधारकः। आयुस्तेजः समुत्साह स्मृत्योजोऽग्नि विवर्धनम् ।। (सु.चि.२४/६८)

The food enhances vitality, strength & makes the body sturdy. Food increases enthusiasm, memory, *agni*, life span, lusture & *ojas*.

आहार शुद्धौ सत्वशुद्धिः । सत्वशुद्धौ ध्रुवो स्मृतिः ।। (श्री. भ. गी.)

Consumption of pure food ie *sātvika āhāra* makes the mind clear. When mind is devoid of blemishes memory power enhances.

"आरोग्यं भोजनाधीनं" (का.सं. खि ५/९)

Health is dependent on food.

त्रयः उपस्तम्भाः इत्याहारः स्वप्नो ब्रम्हचर्यमिति ।। (च.सू. ११/१३)

Food is one among the three sub pillars supporting life.

Benefits of food

प्राणाः प्राणभृतामन्नमन्नं लोकेऽभिधावति । वर्णः प्रसादः सौस्वर्यं जीवितं प्रतिभा सुखम् ।।
तुष्टिः पुष्टिर्बलं मेधा सर्वमन्ने प्रतिष्ठितम् । लौकिकं कर्म यद्वृत्तौ स्वर्गतौ यच्च वैदिकं ।।
कर्मापवर्गे यच्चोक्तं तच्चाप्यन्ने प्रतिष्ठितम् ।। (च.सू. २७/३४९-३५०)

Food helps in sustenance of the life of living beings. All living beings in the world require food. Complexion, clarity, good voice, longevity, intelligence, happiness, satisfaction, nourishment, strength & intellect are all present in food. Professional activities leading to happiness in this world, Vedic procedures leading to heaven & observance of truth, abstinance leading to liberation are all dependent on food.

हिताशि स्यान्मिताशि स्यात् कालभोजी जितेन्द्रियः। पश्यन् रोगान् बहून् कष्टान् बुद्धिमान् विषमाशनात्।।
(च.नि. ६/११)

Most of the incurable diseases are produced due to improper food. So intelligent & self controlled man should consume conducive food in right quantity, at the right time to prevent diseases.

Time for taking food

सायंप्रातर्मनुष्याणां अशनं श्रुतिचोदितम् । नान्तरा भोजनं कुर्यादग्निहोत्रसमो विधिः ।।
विसृष्टे विण्मूत्रे विशदकरणे देहे च सुलघौ । विशुद्धे चोद्गारे हृदि सुविमले वाते च सरति ।।
तथान्न श्रद्धायां क्षुदुपगमने कुक्षौ न शिथिले। प्रदेयस्त्वाहारो भवति भिषजां कालः सतुमतः।।
(सु.उ.६४/८५-८६)

According to classics man should take food twice daily in the morning & evening. Consumption of food in between is contraindicated *like Agnihotri.*

After evacuation of bowels, when senses are clear, body is light, clear belching, heart is devoid of blemishes, *vāyu* is normal, interest for intake of food is present, emptiness in stomach & hunger flares up, one should consume food.

क्षत्संभवति पक्वेषु रसदोषमलेषु च । काले वा यदि वाऽकाले सोऽन्नकाल उदाहृतः ।।
उद्गार शुद्धिरुत्साहो वेगोत्सर्गो यथोचितः। लघुता क्षुत्पिपासा च जीर्णाहारस्य लक्षणं ।।
(भा.प्र.पू.५/११७-११८)

After the digestion of rasa, doṣa & mala, one should consume food without giving consideration to time. Proper belching, clearity, enthusiasm, proper evacuation of urges, lightness in the body, hunger and thirst are the features of proper digestion.

आहारं पचति शिखि दोषानाहार वर्जितः। दोषक्षये पचेद्धातून् प्राणान् धातुक्षयेऽपि वा।। (यो.र.)

The *Pācakāgni* digests food, in absence of food it digests *doṣas*, in absence of *doṣas* it digests *dhātus* & ultimately in absence of *dhātu* it digests *prāṇa,* as it takes away the life. So if one feels extremely hungry he should consume food irrespective of time.

अर्धरात्रेऽपि भुञ्जानः परमार्थं बुभुक्षितः । क्षुधो वैद्यपरित्यागी व्याधिभिर्नाभिभूयते ।। (वृन्दमाधव)

Even though doctors contra indicate food at midnight, if one feels extremely hungry, he should take food even at midnight. Because hunger is one of the nonsuppressible urges.

याममध्ये नभोक्तव्यं यामयुग्मं न लंघयेत् । याममध्ये रसोद्वेगो युग्मातीते बलक्षयः ।। (क्षे.कु.)

One should not take food with in three hours (*1 Yāma*) of consumption of food as it leads to *Rasodvega* & one should not fast more than six hours (ie 2 *yāma*) as it leads to loss of strength.

अतीवायातयामास्तु क्षपा येष्वृतुषु स्मृताः । तेषु तत्प्रत्यनीकाढ्यं भुञ्जीत प्रातरेव तु ।।
येषु चापि भवेयुश्च दिवसा भृषमायता । तेषु तत्कालविहितमपरान्हे प्रशस्यते ।।
रजन्यो दिवसश्चैव येषु चापि समाः स्मृताः । कृत्वा सममहोरात्रं तेषु भुञ्जीत भोजनं ।।
(सु.सू. ४६/४७१-४७३)

In seanons where the nights are lengthy, one should consume food in the morning only, seasons where days are lengthy one should consume food indicated in first *prahara* at night and in afternoon itself. Seasons where day & nights are of same length food should be taken at indicated time.

नाप्राप्तातीतकालं वा हीनाधिकमयापि वा । अप्राप्तकालं भुञ्जानं शरीरे ह्यलघौ नरः ।।
तांस्तन् व्याधीनवाप्नोति मरणं वा नियच्छति । अतीतकालं भुञ्जानो वायुनोऽपहतेऽनले ।।
कृच्छ्राद्विपच्यते मुक्तं द्वितीयं च न कांक्षति । प्रातराशेत्वजीर्णेऽपि सायमाशो न दुष्यति ।।
(सु.सू. ४६/४७१-४७४)

One should not consume food after the prescribed time or food should not be consumed in less or more quantity. Consumption of food before feeling of lightness produces *mandāgni*, indigestion or even death.

If one consumes food after long gap, *Jaṭharāgni* gets destroyed by the aggravated *vāta*, producing difficulty to digest the foot taken. Even though the food consumed in the morning is not digested properly, the food consumed in the evening does not get vitiated.

दिवाप्रबुध्यतेऽर्केण हृदयं पुण्डरीकवत् । तस्मिन् विबुद्धे स्रोतांसि स्फुटत्वं यान्ति सर्वशः ।।
व्यायामाच्च विचाराच्च विक्षिप्तत्वाच्च चेतसः। नक्लेदमुपगच्छन्ति दिवा तेनाऽस्य धातवः ।।
अक्लिन्नेष्वन्नमासिक्तमन्यत्तेषु तु दुष्यति । अविदग्ध इव क्षीरे क्षीरमन्यद्विमिश्रितम् ।।
नैवदुष्यति तेनैव समं संपद्यते यथा । रात्रौ तु हृदये म्लाने संवृतेष्वयनेषु च ।।
यान्ति कोष्ठे च विक्लेदं संवृतं देहधातवः । क्लिन्नेष्वन्नेष्वपक्वेषु तेष्वासिक्तं प्रदुष्यति ।।
विदग्धेषु पयस्वन्यत्पयस्तत्पष्विवार्णितम् । नैशेष्वाहारजाते नाविपक्वेषु बुद्धिमान् ।।
तस्मादन्यत्समश्नीयात् पालयिष्यन् बलायुषो । (च.चि. १५/२३८-२४३)

In the day time, as lotus blooms by the appearance of sun, in the same way all channels open up. As the *rasādi dhātu* are not moistened due to excessive work, thinking, and activeness in mind in the day time, the food in dry *dhātus* does not get vitiated as milk mixed with another milk does not get vitiated, instead gets mixed well.

At night heart is closed & channels are also closed, all *dhātus* are wet. As the cold milk mixed with hot milk gets vitiated, the अक्लिन्न food gets more vitiated by the morning food. One desirous of strength & longevity should consume food in the morning, only when food taken at night is digested properly.

कालभोजनं आरोग्यकराणां ।। (च.सू. २५/४०)

So only *Caraka* gives highest importance for intake of food at proper time for maintenance of positive health.

पथ्यापथ्यमिहैकत्रं भुक्तं समशनं मतम् । विषमं बहुवाऽल्पं वाप्याप्राप्तातीत कालयोः ।।
भुक्तं पूर्वान्न शेषे तु पुनरध्यशनं मतं। त्रीण्याप्येतानि मृत्युं वा घोरान् व्याधीन् सृजन्ति वा ।।
(च.चि.१५/२३५-२३६)

In take of wholesome & unwholesome food together is called *samaśana*. In take of less or more food at irregular time is called *viṣamāśana*. In take of food before digestion of food consumed earlier is called *Adhyaśana*. All the three produce death or dreadful diseases.

नाभोजनेन कायाग्निर्दीप्यते नातिभोजनात्। यथा निरिन्धनो वन्हिरल्पो वाऽतीन्धनावृतः ।।(च.चि.१५/७८)

The digestive fire is not enhanced by the fasting nor by the intake of excessive food as absence of fuel extinguishes the existent fire or excess of fuel extinguishes mild fire.

Special Conditions for Intake of Food
(आहारविधिविशेषायतनानि)

तत्र खल्विमान्यष्टाहारविधिविशेषायतनानि भवन्ति । तद्यथा प्रकृतिकरणसंयोगराशिदेशकालो-पयोगसंस्था उपयोक्तृष्टमानिभवन्ति । (च.चि.१/२१)

Eight factors have to be considered before taking food. They are Nature (*Prakṛti*), processing (*karaṇa*), combination (*saṁyoga*), quantity (*Rāśi*), place (deśa), time (kāla), rules of taking food (*upayoga saṁstha*) and one who takes food (*upayoktṛ*).

1. Nature (Prakṛti)

तत्र प्रकृतिरुच्यते, स्वभावो यः पुनराहारौषधद्रव्याणां स्वाभाविको गुर्वादिगुणोपयोगः तद्यथाः माषमुद्गयोः शूकरैणियोश्च ।। (च.वि.१/२१/१)

Here *Prakṛti* means natural quality of food & medicine like *guru* (heavy), *laghu* (light) etc. As black gram is heavy, green gram is light, pork is heavy & deer's flesh is light.

2. Method of processing food (Karaṇa)

करणं पुनः स्वाभाविकानां द्रव्याणां अभिसंस्कारः संस्कारो हि गुणान्तराधानं उच्यते । ते गुणाच्चः तोयाग्नि सन्निकर्ष शौचमन्थन देशकालवासनभावनादिभिः कालप्रकर्ष भाजनादिभि-श्चाभिधीयन्ते ।।(च.वि.१/२१/२)

यथातोयाग्निसन्निकर्षशौचैस्तण्डुलस्थं गौरवमुपहत्य लाघवमन्ने क्रियते । यदुक्तं सुधौतं प्रस्रुतः स्विन्नः संतप्तश्चौदनो लघुः ।। (च.पा.)

Karaṇa means processing substance which leads to transformation of inherent characters of the substance. They are brought about by the treatment with water, application of heat, cleaning, washing, churning, storing, place, maturing, flowering, impregnation, preservation & container etc.

During formation of substance a particular mode of combination of *pañcabhūta* impart particular properties to the drug or food.

By processing there is change in qualities. For example.

1. Rice washed with water, then cooked by boiling, transform the qualities of raw rice from heavy to light.

२. तथा रक्तशाल्यादेर्लघोरपि अग्निसंयोगादिना लाघवं वर्धते । (च.पा.)

In the same way lightness of red rice is enhanced by cooking.

३. मन्थनाद्गुणादानं यथा शोथकृद्दधि शोथघ्नं सस्नेहमपि मन्थनात् इति ।। (च.पा.)

By Churning, edema aggravating property of curds is transformed in to oedema alleviating, even though fat content is intact.

४. देशेन यथा भस्मराशेरधः स्थापयेत् । (च.पा.)

The processed goose berry along with other drugs, should be kept in the heap of ash. This illustrates the transformation of qualities by storing.

५. वासनेन गुणाधानं यथा अपां उत्पलादिवासनेन सुगन्धानुकरणं । (च.पा.)

Addition of sweet smelling agents like *uptala* in water transforms qualities by flavouring.

६. भाजनेन यथा त्रैफलेनयसीं पात्रीं कल्केनालेपयेत् । (च.पा.)

Container helps in transformation of qualities, as in the context of *Triphala rasāyana,* paste of *Triphala* is smeared to iron vessel.

It is also explained as the basic qualities (innate) can not be changed. Then how processing changes? For example heat of fire, mobility of *vāyu*, unctousness of oil can never be changed.

गुणो द्रव्यविनाशाद्वा विनाशमुपगच्छति । गुणान्तरोपधानाद्वा । (च.पा.)

Basic qualities of drugs are destroyed by destruction of the drug itself.

यथा तु संस्कारेण व्रीहेर्लाजालक्षणं द्रव्यान्तरमेव जन्यन्ति । (च.पा.)

By processing ie frying rice, it is transformed into *lājā* ie change of drug it self, so there is change in the quality.

3. Combination (Saṁyoga)

संयोगः पुनर्द्वयोर्बहूनां वाद्रव्याणां संहतीभावः सविशेषमारभते यं पुनर्नैकैकशो द्रव्याण्यारभन्ते तद्यथा मधुसर्पिषोः मधुमत्स्यपयसां च संयोगः ।। (च.वि. १/२१/३)

Saṁyoga is the combination of two or more substances. This results in manifestation of specific qualities, which are not present when present singly. Ex. combination of ghee & honey, fish & milk.

4. Quantum (Rāśi)

राशिस्तु सर्वग्रह परिग्रहौ मात्रामात्रफलविनिश्चयार्थः तत्र सर्वस्याहारस्य प्रमाण ग्रहणमेकपिण्डेन सर्वग्रहाः परिग्रहः पुनः प्रमाणग्रहणमेकैकाश्येनाहार द्रव्याणां सर्वस्य हि ग्रहः सर्वग्रहः, सर्वतस्य च ग्रहः परिग्रह उच्यते ।। (च.वि.१/४)

Rāśi is the quantity of food to be taken. It is of two types ie *sarvagraha*, the quantity of food taken in its entirity & quantity of each of its ingredients ie *parigraha*.

5. Place (Deśa)

देशः पुनः स्थानं सद्रव्याणां उत्पत्ति प्रचारौ देश सात्म्यं चाचष्टे ।। (च.वि. १/२१/५)

Place relates to habitat. It may be the place of growth, movement of a substance in a partilar locality, like drugs grown in *Himalayās* are potent, those grown in desert are light, the *deśa* can be divided into three ie.

Jāṅgala, Ānūpa, Sādhāraṇa and the food should be consumed accordingly.

6. Time (Kāla)

कालो हि नित्यगश्चावस्थिकश्च तत्रावस्थिको विकारमपेक्षते नित्यगस्तु ऋतु सात्म्यापेक्षः।।
(च.वि.१/२१/६)

Daily (Nityaga)

– In the form of day, night

– one should consume food two times a day according to rules.

One should consume food according to season as told in *ṛtu* caryā.

Conditional (Āvasthika)

According to disease one should consume food which is conducive to the disease. In health one should see his age & consume food accordingly. Age can be divided into *bāla* (young), *madhyama* (middle age) & *Vṛddhāpya* (old age). Even the quantity of food should be decided according to age of a person.

7. Dietetic rules (Upayoga saṁstha)

उपयोगसंस्था तूपयोगनियमः स जीर्ण लक्षणापेक्षः। (च.वि.१/२१/७)

They are the dietetic rules, dependent on symptoms of digestion.

उद्गार शुद्धिरुत्साहो वेगोत्सर्गो यथोचिता। लघुता क्षुत् पिपासा च जीर्णाहारस्य लक्षणं।।
(भा.प्र.पू. ५/११८)

Clear belching, enthusiasm, evacuation of urges accordingly, lightness, hunger and thirst are the features of proper digestion.

Rules for taking food

तत्रेदमाहारविधिविधानमरोगाणामातुराणां चापि केषांचित् काले प्रकृत्यैव हिततमं भुञ्जानां भवति, उष्ण, स्निग्ध, मात्रावत्, जिर्णे, वीर्याविरूद्धम्, इष्टे देशे, इष्टसर्वोपकरणं, नातिद्रुतं, नाति विलंबितं, अजल्पन्, अहसन्, तन्मना भुञ्जीत, आत्मानमभिसमीक्ष्य सम्यक्। (च.वि. १/२४)

These are the rules for taking food for diseased as well as healthy. One should consume articles which are wholesome to body.

One should eat in proper quantity which is hot, unctous, not contradictory in potency & that too after proper digestion of previ-

ous meals. Food should be taken in proper place, without talking, laughing, with concentration of mind & considering one self.

(1) Eat warm food (उष्णमश्नीयात्)

– उष्णं हि भुज्यमाने स्वदते– Tasty
– भुक्तं चाग्निमौदर्यमुदीरयति– increases *Agni*
– क्षिप्रं जरां गच्छति– gets digested quikly
– वातनुलोमयति– *Vāta* gets Pacified
– श्लेष्मणां परिह्रासति भिन्नसंघातं करोति तस्मादुष्णमश्नीयात् Reduces the excess of *kapha*

(2) Eat unctous food (स्निग्धमश्नीयात्)

–स्निग्धं हि भुज्यमाने स्वदते – Unctuous food is delicious
–भुक्तं चानुदीर्यमग्निमुदीरयति – It stimulates the digestive fire.
–क्षिप्रं जरां गच्छति – gets digested fast.
–वातानुलोमयति – pacifies *vāta*
–शरीरमुपचिनोति – nourishes the body
–दृढीकरोतिइन्द्रियाणि – strengthens the sense organs
–बलाभिवृद्धिमुपजनयति – Promotes strength
–वर्णप्रसादं चाभिनिर्वर्तयति – brings out good complexion
–तस्मात् स्निग्धमश्नीयात् ।

(3) Eat according to quantity (मात्रावदश्नीयात्)

– मात्रावद्धि भुक्तं वातपित्तकफानपीडयदायुरेव विवर्धयति केवलं ।। (च.वि. १/२४/३)

If food is taken in proper quantity it prolongs life, it does not aggravate *doṣas*.

–सुखं गुदमनुपर्येति । Easily passes down to rectum.

–न चोष्माणमुपहन्ति । does not impair the power of digestion

–अव्यथं च परिपाकमेति । gets digested without difficulty

तस्मान्मात्रावत् अश्नीयात् । so food should be taken in proper quantity.

मात्राशी सर्वकालं स्यान्मात्रा ह्यग्नेः प्रवर्तिका। मात्रा द्रव्याण्यपेक्ष्यंते गुरुण्यपि लघूनि च ।।
गुरुणामर्धसौहित्यं लघूनांनाति तृप्तता । मात्राप्रमाणं निर्दिष्टं सुखं यवद्विजीर्यति।। (अ.हृ.८/१-२)

The food consumed in proper quantity at proper time always enhances digestion. It is also dependent on nature of food consumed.

Heavy food should be consumed half of stomach, light food should not be consumed in excess. The amount of food consumed should be so that it gets digested easily.

तत्र शालिषष्टिकन्मुद्गलावकपिञ्जलैणशशरवशंबरादिन्याहार द्रव्याणि प्रकृतिलघून्यपि मात्रापेक्षिणी भवन्ति ।। (च.पा.)

rice, green gram, common quail, antelope, rabbit etc are light by nature.

तथा पिष्टेक्षुक्षीरविकृतिमाषानूपौदकपिशितादीन्याहारद्रव्याणि प्रकृति गुरूण्यपि मात्रामेवापेक्षन्ते।। (च.पा.)

Sugar cane, milk products, black gram and meat of aqueous animals are heavy by nature. It should be consumed in proper quantity.

(4) Eat after feeling of hunger (जीर्णेऽश्नीयात्)

अजीर्णे हि भुञ्जानस्याभ्यवहृतमाहारजातं पूर्वस्याहारस्य रसमपरिणतमुत्तरेणाहार रसेनोपसृजत् सर्वान् दोषान् प्रकोपयत्याषु । (च.वि.१/२४/४)

One should take food after the digestion of previous food. Otherwise improperly digested food mixes with food product & aggravates all *doṣās*.

जीर्णे तु भुञ्जानस्य स्वस्थानस्थेषु, दोषेष्वग्नौ चोदीर्णे जातानां च बुभुक्षायां विवृतेषु च स्रोतसां मुखेषु विशुद्धे चोद्गारे हृदये विशुद्धे वातनुलोम्ये विसृष्टेषु च वात मूत्र पुरीष वेगोष्वभ्यवहृतमाहारजातं सर्वशरीरधातून् प्रदूषयदायुरेवाभि वर्धति केवलं । तस्मात् जीर्णमश्नीयात् ।। (च.वि. १/२४/४)

If one consumes food after previous food is digested properly, then *doṣas* are in their site & kindle the digestive fire. There is good appetite, pure eructation, channels open up, unimpaired cardiac function, proper evacuation of faeces, flatus & urine, promotes longevity & growth.

(5) Eat food which is not Contradictory (वीर्याविरुद्धमश्नीयात्)

विरुद्धवीर्याहारजैर्विकारैर्नोपसृजति । तस्मात् वीर्याविरुद्धमश्नीयात् । (च.वि. १/२४/५)

One should take food which are not having contradictory properties. Otherwise person may get afflicted with diseases like skin diseases (*kuṣṭha*), *visarpa etc.*

(6) Eat in desired place with desired articles (इष्टेदेशे इष्ट सर्वोपकरणं चाश्नीयात्)

इष्टे हि देशे भुञ्जानो नानिष्टदेशजैर्मनो विघातकरैर्भावैः मनो विघातं प्राप्नोति।।(च.वि.१/२४/६)

By doing this one does not get afflicted with factor which result in emotional strain, one should be supplemented with all accessories.

(7) Do not eat in hurry (नातिद्रुतमश्नीयात्)

अतिद्रुतं हि भुञ्जानस्यत्स्नेहनमवसादनं भोजनस्याप्रतिष्ठितं च ।। (च.वि. १/२४/७)

If food is taken very fast, then food may enter in wrong passage. It gets depressed & may not enter into stomach properly.

भोज्यदोषसाद्गुण्योपलब्धिश्च न नियता ।

One can not relish the taste of the food. Person cannot make out some foreign bodies if present.

(8) Do not eat very slowly (नातिविलम्बितमश्नीयात्)

न तृप्तिमधिगच्छति– does not give satisfaction.
बहुभुङ्क्ते– Eats more than required.
शीतीभवत्याहार जातं– food becomes cold.
विषमं च पच्यते– irregularly digested.
तस्मान्नाति विलम्बितमश्नीयात्

(9) Eat with concentration without talking and laughing (अजल्पन् अहसन् तन्मना भुञ्जीत)

एव ही दोषाः भवन्ति । य एवातिद्रुतमश्नतः ।। (च.वि.१/२४/९)

Similar problems as in case of fast intake of food occurs.

(10) Eat after considering one self thoroughly (आत्मानमभिसमीक्ष्य भुञ्जीत सम्यक्)

इदं ममोपशेते इदं नोपशेत इत्येवं विदितं ह्यस्यात्मना आत्मसात्म्यं भवति । (च.वि.१/२४)

One should consume food in prescribed manner. The knowledge of usefulness of food, whether it is wholesome for him or not should be thought.

8. Person who takes food (Upabhoktā)

उपभोक्ता पुनर्यस्तमाहारमुपयुंक्ते यदायत्तमोकसात्म्यं ।। (च.वि. १/२२)

He is the one responsible for the habitual intake of things ie *okasātmya.*

रसान् द्रव्याणि दोषांश्च विकारांश्च प्रभावतः । वेद यो देश कालौ च शरीरं च स नो भिषक् ।।

The doctor who has got good knowledge about *rasa*, drug, *doṣa*, disease, place, time & body properly is known as good physician.

Duration of food digestion (आहार पाचन अवधि)

यामैकश्चतुर्भिर्द्वाभ्यां च भोज्यं भेषज्ययोः समे । पाकेऽग्नौ युक्तयोर्द्राक् च तीक्ष्णे मन्दे पनश्चिरात् ।।
(अ.स.सू. ११/६)

Food will be digested in four *yāma*, medicine in two *yāma*, in *samāgni* person. In *tīkṣṇāgni* person it gets digested fast & takes longer duration in *mandāgni* person.

Always conducive food (सदा पथ्य आहार)

भोजनाग्रे सदा पथ्यं लवणार्द्रक भक्षणं। अग्निसंदीपनं रुच्यं जिह्वाकण्ठ विशोधनम्।।(भा.प्र.पू.५/१३०)

Taking ginger & salt before food is always good; it enhances *Agni*, taste, clears tongue & throat.

Wholesome diet (Pathya āhāra)

Rakta śāli (Oryza sativa Linn.), *Mudga* (Phaseolus radiatus Linn.), rain water, *saindhava* (rock salt), *Jīvanti* (Leptadenia reticulate W & A), meat of *eṇa* (antelope), *lāva, godhā*, *rohita*, cow's ghee, cow's milk, tila taila (sessamme oil), fat of pig, fat of *culūki* fish, fat of white swan, fat of hen, fat of goat, ginger, grapes and sugar are considered as most conducive among food articles.

Unwholesome diet (Apathya āhāra)

Yavaka (variety of Hordeum vulgare Linn.), *māṣa* (phaseolus mungo Linn), river water in rainy season, *ūṣara* (salt from saline soil), mustard, beef, meat of young dove, meat of frog, fish *cilcima*, ghee of sheep, sheep's milk, kusumbha taila, fat of buffalo, fat *kumbhīra* (crocodile), fat of *caṭaka* (sparrow), fat of elephant, *nikuca* (Atrocarpus nikucha Roxb) *ālba*(?) & *phāṇita* are considered among most non conducive among food articles.

Order of intake of different tastes

अश्नीयात् तन्मनी भूत्वा पूर्वं मधुरं रसं। मध्येऽम्ल लवणौ पश्चात् कटुतिक्त कषायकान् ।।
(भा.प्र.पू.५/१३२-१३३)

One should consume food with full concentration.

I sweet - pacifies aggravated *vāta* due to excess of hunger.

II sour & salt - Increase *Agni*, so that digestion of food is easy.

III Bitter & astringent- In the end reduces *pitta* produced in excess.

घृतपूर्वं समश्नीयात् कठिणं प्रोक्ततो मृदु । अन्ते पुनर्द्रवाशी तु बलारोग्ये न मुञ्चति ।।
(भा.प्र.पू.५/१३७)

The hard food should be taken along with ghee, in the end water liquids should be consumed. This will produce health.

Classification of food

1. *Cūṣya*	suckable	food like sugurcane, pomegranate
Peya	drinkable	juices, *pānaka*
Lehya	lickable	*Rāsāla, kvāthita* semisolid

Bhojya	eatable	liquid foods like *Bhakta, sūpa*
Bhakṣa	bitten eaten	*ladduka, modaka*
Carvya	hard food	*cipita, śaṣkuli*

2. *Aśita* soft food
   Khādita hard food bitten & eaten
   Pīta drinkable
   Līḍha lickable
3. Depending on Yoni — *sthāvara* Vegetarian; *Jāṅgama* non vegetarain
4. Depending on effect
   Hita udarka conducive
   Ahita udarka non conducive
5. Depending on taste of food
   Madhura sweet
   Amla sour
   Lavaṇa salt
   Kaṭu pungent
   Tiktā bitter
   Kaṣāya Astringent
6. Depending on quality of food

गुरु	heavy	श्लक्ष्ण	smooth
लघु	light	खर	rough
उष्ण	hot	सान्द्र	dense
शीत	cold	द्रव	liquid
मन्द	mild	कठिण	hard
तीक्ष्ण	sharp	मृदु	soft
स्निग्ध	unctous	स्थिर	immobility
रूक्ष	dry	सर	mobility
सूक्ष्म	minute	विशद	nonslimy
स्थूल	gross	पिच्छिल	slimy

7. According to *Yoga*
   Sātvika
   Rājasa
   Tāmasa

Order of intake of different foods (भोजनक्रम)

आदावन्ते च मध्ये च भोजनस्य तु शस्यते । निरत्ययं दोषहरं फलेष्वामलकं नृणां ।।
मृणाल बिस शालूक कण्डेक्षु प्रभृतीनि च । पूर्व योज्यानि भिषजा ननु भुक्ते कदाचन ।।
(सु.सू. ४६/४६३-४६४)

Among fruits goose berries is the best & can be consumed before, in the middle & at the end of meals, lotus stalk, variety of grass should always be consumed before food.

कुर्यात् क्षीरान्तमाहारं न दध्यन्तं कदाचन । लवणाम्ल कटूष्णानि विदाहीन्यत्ति यानि तु ।।
तद्दोषहर्तुमाहारं मधुरेण समापयेत् । (भा.प्र.पू. ५/१८६)

After the intake of food, always consume milk but never consume cards. Because *doṣas* produced due to consumption of salt, sour, pungent & burning sense will be pacified by *madhura rasa* consumed at the end.

Conduciveness (Sātmya)

१. तत्र सात्म्यं नाम सहात्मना भवत्यभ्यस्तं तदौचित्यात् उपशेते इत्येके ।। (अ.हृ.सू.१०/४३)
२. सहात्मना भूतं सात्म्यं आत्मनः सहायभूतं अनुकूलं सुखावहमित्यर्थं ।। (आ.र.)
३. सात्म्यासात्म्ये एव निरूपाधिके पथ्यापथ्ये उच्यते ।। (आ.र.)
४. सात्म्यं नाम तद्यत् सातत्येनोपसेव्यमानमुपशेते ।। (च.वि. ८/११८)
—सात्म्यं नाम तत् यदात्मानुपशेते सात्म्यार्थे ह्युपशयार्थः ।
सात्म्यं नामेति ओकसात्म्यं । ओकादिति अभ्यासात् ।। (च.वि. १/२०)
—यच्चेष्टाहारव्यापाश्रयं उपशेते यदौचित्योदकः सात्म्यं तदुच्यते ।। (च.सू.)
—सात्म्यं नाम सुखं यत् करोति तदुच्यते ।। (सु.सू. ३५/३९डल्हण)

1. *Sātmya* is the one which is conducive to one self.

2. That which becomes a part of one self, helpful & conducive to one self is *sātmya*.

3. *Sātmya* & *asātmya* are nothing but *pathya* & *Apathya*

4. *Sātmya* is that which can be consumed for a long duration.

Classification of Conduciveness (Sātmya)

सात्म्यानि तु देश कालजात्यर्तुरोगव्यायामोदक दिवास्वप्नरसप्रभृतीनि प्रकृतिविरुद्धान्यपि यान्यबाधकराणि भवन्ति ।। (सु. सू. ३५/३९)

यो रसः कल्पते यस्य सुखायैव निषेवितः । व्यायामजातमन्यद्वा तत् सात्म्यमिति निर्दिशेत् ।।

(सु.सू. ३५/४०)

तत्रिविधं प्रवरावरमध्यविभागेन । सप्तविधं तु रसैकैकत्वेन सर्वरसोपयोगाच्च । तत्र सर्व रस प्रवरं अवरमेकरसं, मध्यं तु प्रवरावरमध्यस्तं ।

सात्म्यं आहाराचार भेदेन द्विविधं ।। (डल्हण टीका)

General types	Depending on tastes	According to Ḍalhaṇa
Place	Sweet	Food
Time	Sour	Regimen
Species	Salt	
Season	Pungent	
Disease	Bitter	
Exercise	Astringent	
Water	All tastes	
Taste	**Depending on tastes**	
Nature	Superior	
	Mediocre	
	Inferior	

1. Conducive to place (Deśa śātmya)

देशो द्विविधः भूमिः आतुर शरीरं च । आतुरशरीर सात्म्यं समुदाय–मधुरोसर्वधातुवर्धकः। अवयव–चक्षुष्य, केश्य, कण्ठ्य मधुरो रसः आजन्म सात्म्यं ।

Place is of two types land & body

Ātura śarīra sātmya (conducive to one's body)
- *samudāya* (colletively conducive) sweet is conducive for all *dhātu*
- *Avayava* (conducive to one organ) conducive for eye, hair, throat ie *Cakṣuṣya, keśya, kaṇṭhya*

जाङ्गल देशे यौ आहारौ तौ अनूपेविपरीतः। बाल्हीक पल्लवचीनादीनां माष गोधूम मार्द्वीकादिभिः सात्म्यं।।

Land
- *samudāya* (collectively land) *Jāṅgala*, *Ānūpa*, *Sādhāraṇa*
- *Avayava* (parts)
  - *Bālhika* – black gram
  - *Pallava* – wheat
  - *Cīna* – *Mārdvīka*

2. Conducive to species (Jāti sātmya)

मनुष्यजातेः सात्म्यं शाल्यादयः । मृगपक्षिजातीनां तृणपतंगादीनी ।।

The food that are conducive for species ie for human beings rice etc grains are conducive, for animals & birds grass, insects etc are conducive.

3. Conducive to season (Ṛtu sātmya)

ऋत्वभिहितम् अन्नपानादि ।

Food that are conducive to particular season is *ṛtu sātmya*

4. Conducive in disease (Roga sātmya)

It is nothing but *pathya*. Milk is conducive in tumours, ghee is conducive in udāvarta and honey is conducive in obstinate urinary disorders.

5. Conducive exercise (Vyāyama sātmya)

व्यायामस्त्रिविधः कायवाङ्मनसो भेदात् ।

Exercise is of three types ie related to body, speach and mind. Exercise enhances the power and immunity of a person.

6. Conducive water (Udaka sātmya)

उदकग्रहणमाहारोपलक्षणं तेनचतुर्विधोऽप्याहारः संगृहीतः।।

Water should be consumed according to the diet consumed.

7. Conducive day sleep (Divāsvapna sātmya)

दिवास्वप्नप्रभृति ग्रहणाज्जागरणादीनां ग्रहणं ।

Day sleep is conducive in the conditions like sprue (Grahaṇī), night awakening etc.

8. Conducive taste (Rasa sātmya)

मधुराम्ललवणतिक्तोषण कषायकाः षड्रसाः । एकरसाभ्यासं अवर सात्म्यं । सर्वरसाभ्यासं प्रवर सात्म्यं । मध्यन्तरं मध्यम सात्म्यं ।

Consuming single taste is inferior, all tastes superior and intermediate state is mediocre conduciveness.

9. Conducive to nature (Prakṛti sātmya)

स्वभावेन विरुद्धानि इत्यर्थः ।

The practices should be opposite to one's own nature or Prakṛti. The person having vāta prakṛti should consume food having salt, sour, sweet taste and unctous and hot properties.

10. Conducive to time (Kāla sātmya)

Time can be mainly divided into conditional (Āvasthika) and daily (Nityaga).

Conditional
- Disease - wholesome diet (Pathya)
- Healthy
  - Childhood
  - Middle age
  - Old age

Daily — Daily regimens
— Seasonal regimens

The person should consume food according to seasons. He should give due respect to his age, as well as disease stage, while consuming food.

Conduciveness by habituation (Oka sātmya)

ओकादि अभ्यासात् सात्म्य । औचित्यात् ओकसात्म्यं तदुच्यते ।। (च.सू. ७/४९)
अपथ्यमपि हि निरन्तराभ्यासद्विषमिवाशी विषस्य नोपघातकं भवतीति भावः ।।
(च.पा.सू.७/४९)

Oka sātmya is nothing but conduciveness developed due to continuous intake of particular substance, even though it is not good for the body. As the chronic poison does not effect the person suddenly, in the same way constant intake of nonconducive substance over a long period does not produce ill effects suddenly.

Conducive to place

भूमिसात्म्यं दधिक्षीर करीरं मरुवासिषु । क्षारः प्रोच्यते मत्स्यास्तु सैन्धवेष्वमकेषु च ।
तैलाम्लं कन्दमूलानि मलये कोङ्कणे पुनः । पेया मन्थ उदीच्येषु गोधूमाऽवन्तिभूमिषु ।।
बाल्हीका बह्लीवाश्चीनाः शूलीका यवनाः शकाः । मांस गोधूम मार्द्वीक शस्त्र वैश्वानरोचिताः।।
(अ.सं.सु.७/२३२-२३४)

Curds, milk and Karīra are conducive in deserts like Rajasthan. Alkali is conducive to eastern India. Fish is conducive to Sindh. Oil and sourness are conducive to Paṭhāns. Rhizomes and roots are conducive to Malaya. Thin gruel, mantha and wheat are conducive to Konkaṇa, north India and Āvanti places meat, wheat and mārdvīka a fermented preparations are conducive to foreigners and chinese.

Conducive to body

देह सात्म्यं घृतक्षीरं मद्यं मांसं च कस्यचित् । पेया यूषो रसोन्यस्य गोधूमोऽभ्यस्य शालयः ।।
अहितैरपि तेषां च तैरवोपहितं हितम्

Ghee, milk, alcohol & meat are conducive to some people, Peya, Yūṣa, wheat & rice are conducive to some other people.

अन्नपानौषधं दोषमात्राकालद्यपेक्षया । सात्म्यं ह्याशु बलं धत्ते नातिदोषं च बह्वपि ।
स्रंसनं सत् पयो गव्यं भवति ग्राहि कस्यचित् । मन्दोग्निर्भवति प्रायः कफवातोत्तरे हिमे ।।
विषघ्नेनापि पयसा देहेऽहेवर्धते विषं । स्थूलस्थविर बालादौ वमनादि निषिध्यते ।।
तक्रमामं कफं कोष्ठे हन्ति कण्ठे करोति तु । वातहत्वेऽपि मृद्वीकाखर्जूरं कोष्ठवातकृत् ।।
(अ.सं.सु. ७/२३५-२३८)

Medicine, food and drink, when consumed by considering *doṣa* and quantity, give strength quickly as it is *sātmya* to the body.

Conducive food & medicine even if consumed in excess quantity, do not aggravate *doṣas* to great extent.

Even though cow's milk is having laxative nature, it becomes bowel binder in some people ie *krūrakoṣṭha* person.

Even though cold season enhances the *agni* naturally, due to predominance of *vāta* and *kapha, agni māndya* is produced.

Even though milk acts as antidote for poison, in the body of snake it enhances the potency of poison of snake.

Emesis and purgation remove the *doṣas*, but they are contraindicated in children, aged and obese persons.

Even though butter milk reduces the *vāta in koṣṭha* (abdomen), it increases the *kapha* in the throat, grapes and dates are *vātahara*, even then they increase *vāta* in *koṣṭha* (abdomen).

नातिपथ्यः शिखि पथ्यः श्रोत्रस्वरवयोदृशाम् । दृष्टेः स्पर्श हिमं द्रव्यं श्रोत्रस्योष्णं तु पूजितम् ।।
पयः स्वादु हिमं शीतं विपरीतं ततो दधी । कालेन जायते तस्मात् क्षीरवच्च पुनर्घृतं ।।
पयो दधी च वातघ्नं अजातं वातलं तु तत् । तक्रं ग्राही कषायम्लं अम्लं एव तु भेदनम् ।।
धातकी गुड तोयानि कारणं मधुसक्तुयोः । शीतो न तु तदाद्यते स्निग्धाम्ललवणाहिताः।।
अदमन्थ दिवास्वप्नौ ग्रीष्मादन्यत्र गर्हितौ । समयोगेऽपि धर्माद्या वातादिचय हेतवः । आश्चोतनमभिष्यन्दे युञ्जीतोर्ध्वं दिनत्रयात् ।। (अ.सं.सू. २३९-२४४)

A flesh of peacock is generally not conducive, but it is conducive to ear, voice & eyes is an example for subject specific Cold drugs are having qualities opposite to that of eyes & are conducive to eye. Hot drugs are *vāta* alleviating in nature & are conducive to ears which are organs predominent in *vāyu*.

Example for specific nature.

Milk is sweet and cold in nature, where as curds made from milk is sour, hot & binds the bowels. After some time by processing the ghee is having same qualities as milk. Butter milk is astringent, sour and binds the bowels, after some time when it turns sour, it becomes purgative. It is an example for stage specific property.

Milk & curds are *vāta hara,* where as *udaśvit* increases *vāta*.

Dhātaki and Jaggery are found in both *madya* & *saktu*. The key factor *Dhātaki* is responsble for the formation of *madya & saktu*.

Sour, salt and unctous things in cold seasons are non-conducive in the end of cold season. Day sleep in *Griṣmaṛtu* is conducive, in other *ṛtu* it is not conducive.

चयप्रकोप प्रशमाः वायोः ग्रीष्मादिषु त्रिषु । वर्षादिषु च पित्तस्य श्लेष्मणा शिशिरादिषु ।।

The accumulation, aggravation and alleviation of *vāta* in *grīṣma, varṣā, śarat* respectively, of *pitta* in *varṣādi ṛtu* and of *kapha* in *Śiśirādi ṛtus* respectively are the examples for time specific nature.

Condition specific conduciveness

रसायनं काकमाचि सद्यः पर्युषिता विषम् । मूलकं दोषजिब्दालं विपरीतं तु कन्दवत् ।।
ज्वरे पेया कषायाश्च सर्पि क्षीरं विरेचनं । षडहं षडहं युञ्ज्याद्वीक्ष्य दोषबलाबलम् ।।
छर्दि हृद्रोग गुल्मार्ते वमनं च चिकित्सिते । निशिद्धमपि निर्दिष्टं बस्तिरर्शसकुष्ठिनो ।।
ज्वरे तुल्यार्तुदोषत्वं प्रमेहे तुल्यदूष्यता । रक्तगुल्मे पुराणत्वं सुखसाध्यत्व हेतवः।।
(अ.सं.सू.७/२४५-२४८)

Kākamaci in fresh condition is rejuvenating, after it gets vitiated it is unwhoesome like poison. Tender Radish is Tridoṣa śāmaka, after full maturation it is Tridoṣakāraka. In fever thin gruel, ghee, milk, purgation and emesis are adviced for a period of 6 days each, but according to condition it can be changed. *Vomiting & heart diseases emesis* is contra indicated. In the same way *Basti* is contra indicated in *Arśa & Kuṣtha*. In upward moving *doṣas, emesis* is contra indicated, but in *Tridoṣaja & Satata Chardi, emesis* is indicated. In the same way in conditions of highly vitiated *doṣa*, weakness due to excessive medicine & *vāta vṛddhi* even in Arśa, *Basti* is indicated. In *Kuṣtha* excessively vitiated *doṣa* lead to dryness in *Basti* & in this condition basti is indicated. Similarity in season, *doṣa & Dhātu* are factors for incurability. But similarity of seasons in fever, similarity of *Dūṣya* in *Prameha & chronicity* in *Rakta Gulma* are factors for easy curability. Even though *Aścotana* is conducive in *Netrābhiśyanda (conjunctivitis)*, it is contra indicated in first 3 days.

अञ्जनं पक्वदोषस्य प्रतिश्याये च नावनम् । नाति प्रवृद्धे तिमिरे सिरामोक्षो विधीयते ।।
दुष्टास्रसंभवेऽपीष्टो नास्रपित्ते सिराव्यधः । अपथ्यं पथ्यमप्यन्नं निशायां नेत्ररोगिणां ।।
अहिताः सक्तवः शुष्का हितास्ते तु प्रमेहिणः । गुल्मिनः क्षीर दध्यादि हपुषाद्यैर्हितम् युतम् ।।
वातलं वातकोपेऽपि वर्षासु मधु शस्यते । तदेव मद्यं मद्यस्य विषस्य तु विषान्तरम् ।।
घृतमानूपदेशोत्थं हेमन्ते च बलाधिकम् । आलस्य गौरवे रूपं वातजेऽपि ज्वरे पुरः ।।
स्वेदैर्याति श्रमं दाहः प्रायो लशुन पातजः । दिवास्वप्ना ज्वंरा याति भुक्तमन्येद्यरद्य न ।।
(अ.सं.सू.७/२४९-२५५)

Condition specific– *Añjana in Pakvāvastha* of *Doṣas, Nasya* in *Pratiśyāya & Sirāvyadha* in initial stage of *Timira are conducive.*

Disease specific– *Sirāvyadha* is best in vitiated blood, but contra indicated in *Rakta Pitta.*

Nature of Disease– Rice is conducive always, but unwholesome for person suffering from eye diseases at night.

Aetiology specific– Dry *saktu* is generally non conducive, but conducive for *pramehi*.

Drug specific– Milk & curds are nonconducive for *Gulma* patient, but *Hapuṣa* the combination of them is conducive.

Nature of substance– Honey is *vāta kara*, but in *vāta prakopa* during rainy season, it is conducive. Alcohol produces *madātyaya*, but it is used to subside problems due to *madātyaya*. In the same way poison is used to counteract the effects of poison.

Incompatibility (Viruddha)

Derived from root
वि, रुध् & क्त:
विरोध विशिष्ठ:
Viruddha is some thing special or contradictory.

Definitions

१. यत् किञ्चित् दोषमुत्क्लेष्य न हरेत् तत् समासतः विरुद्धं ।। (अ.हृ. सू.७/४५)
अन्नपानौषधं वा दोषमुत्क्लिश्य स्वस्थानात् सञ्चल्य, बहिर्न निष्कासयेत् संक्षेपतो विरुद्धं ।।

The food, drink and medicine, which does the dislodgement of *doṣa* from its site ie *Doṣotkleśa*, but does not expel it out is known as *Viruddha*.

२. यत् किञ्चित् दोषमास्राव्य न निर्हरति कायतः आहारजातं तत् सर्वमहितायोपपद्यते ।।
(च.सू.२६/८५)

The food & drugs which dislodge the *doṣas* from its normal seat, but do not expel it out of the body are regarded as *Viruddha*.

३. उत्क्लेश्य दोषान् न हरेत् द्रव्य यत् तत् समासतः विरुद्धः तद्धि धातूनां प्रत्यनीकतया स्थितं।।
(अ.हृ.सू.९/७)

Drug which agravates the *doṣa* in the body, but does not expel it out & acts condradictory to the body is known as *viruddha*.

४. यत् किञ्चित् दोषमुत्क्लिश्य भुक्तं कोपान्न निर्हरेत् रसादीष्वयथार्थं वा तद्विकाराय कल्पते।।
(सु.सू.२०/२०)

डल्हण टीका-रसादिषु अयथार्थं वा इति रसादि धातुषु अयथार्थं प्रयोजनं विरुद्धं रसादीनां जीवनादि प्रयोजन विरोधि रसादि धातु प्रदूषणकरं इत्यर्थः ।

The drugs and diets which dislodge the *doṣas* from their original site, but do not expel them out of the body & they vitiate the *rasādi dhātus*. They do not help in the nourishment of *dhātu*, but instead they vitiate *dhātus* & produce many diseases, are known as *viruddha*.

५. विरुद्धमपि चाहारं विद्याद्विषगरोपमम् । (अ.हृ.सू. ७/२९)

The contradictory food (*viruddhāhāra*) are unwholesome to the body, as acute poison and chronic poison (*gara*) & may produce death.

६. देहधातु प्रत्यनीकभूतानि द्रव्याणि देहधातुभिर्विरोधं आपद्यन्ते ।। (च.सू.२६/८२)

The drugs which are antagonistic to body & *dhātus* are called as *viruddha*.

Classification of incompatibility (Viruddha)

यच्चापि देशकालाग्निमात्रा सात्म्यानिलादिभिः । संस्कारतो वीर्यतश्च कोष्ठावस्था क्रमैरपि ।।
परिहारोपचाराभ्यां पाकात् संयोगतोऽपि च । विरुद्धं तत् च न हितं हृत्संपद्विधिभिश्च यत् ।।
(च.सू. २६/८६-८७)

Place	Processing	Cooking
Time	Potency	Combination
Agni	Bowel	Wholesomeness
Quantity	State of health	Quality
Conduciveness	Order of intake	Rules of intake
Doṣa		Psychological factors.

Acc to S.S.
Combination
Quanlity
Processing
Tastes

1. Place (Deśa viruddha)

विरुद्धं देशतस्तावद्रूक्षतीक्ष्णादि धन्वनी। अनूपे स्निग्ध शीतादि भेषजं यन्निषेवते।। (च.सू.२६/८८)

There are three types of lands.

जाङ्गलेवात भूयिष्ठं आनूपे तु कफोल्बणं । साधारणं सममलं त्रिधा भूदेशमादिशेत्। ।(अ.हृ.सू.१/२३)

Jāṅgala is dry land with less water, so the animals, plants & humans in that land are *vāta* predominant in nature. If they consume dry (*Rūkṣa*), sharp (*tīkṣṇa*) food and medicine, it will lead to aggravation of *vāta*.

In the same way *Ānūpa* land is characterised by excess water & unctousness, so people are afflicted with *kapha* disorders. So if they consume more of unctous, cold, food & medicine, it will lead to *kapha* disease. This is deśa *viruddha*. उष्णार्तस्य मधु मरणाय Honey may produce death of person suffering from complications of heat.

2. Time (Kāla viruddha)

कालतोऽपि विरुद्धं यच्छीतरूक्षादिसेवनं। शीते काले, तथोष्णे च कटुकोष्णादिसेवनं ।। (च.सू.२६/८९)

Excessive in take of dry cold food in cold seasons & excessive intake of hot and pungent food during hot seasons are quoted as *kāla viruddha.*

Age– One should consume food according his age. In young age children, *kapha* is predominant, less amount of food which is nourishing should be consumed. In middle age *pitta* is predominent, so more amount of food, which is *pitta* alleviating in nature should be consumed. In old age *vāta* is predominant, so moderate amount of *vāta* alleviating & strength promoting food should be consumed.

Day– Food should be consumed two times in day ie morning & evening. At night curds should not be taken. At night amount of food should be less.

Disease conditions and conducive food– Food which is conducive to a particular disease should be consumed.

Ex :excess of liquids in diarrhoea.

पर्युषिता काकमाची मरणाय spoilt Kākamaci (Solanum indica) produces death.

3. Digestive fire (Agni viruddha)

विरुद्धमनले तद्वदन्नपानं चतुर्विधे । तैर्भवेद्विषमस्तीक्ष्णो मन्दश्चाग्नि समैः समः ।।
यामैश्चतुर्भिर्द्वाभ्यां वा भोज्य भेषज्ययोः समे । पाकोऽग्नौ युक्तयोर्द्राक्तु तीक्ष्णे मन्दे पुनश्चिरात् ।।
(च.सू. २६/९०)

In *samāgni* food gets digested with in two *yāma*. In *tīkṣṇagni* it gets digested with in 4 *yāma*, whereas it gets digested after 4 *yāma* in *mandāgni*. Heavy food in *mandāgni* person & light food in less quantity in tikṣṇāgnī person act as *viruddha*.

4. Quantity (Mātrā viruddha)

मधु सर्पिः समघृतं मात्रया तद्विरुध्यते ।

Honey & ghee in equal proportion act as *mātrā viruddha* ie contradictory in quantity.

5. Conduciveness (Sātmya viruddha)

कटुकोष्णादिसात्म्य स्वादुशीतदिसेवनं यत्तत् सात्म्य विरूद्धं ।। (च.सू. २६/९०)

In take of sweet and cold food for a person, who is accostomed to pungent & hot food, it is contradictory in conduciveness.

6. Processing (Sanskāra viruddha)

या समानगुणाभ्यास विरुद्धान्नौषध क्रिया । संस्कारतो विरुद्धं तद्धोभ्यं विषवत् भवेत् ।।
एरण्ड सीसकासक्तं शिखिमांसं तथैव च । (च.सू. २६/९१)

Meat of peacock roasted in caster oil, boiling of butter milk, using the oil for frying, which has been used for the purpose of frying earlier. Adding honey to hot water are antagonistic. The pigeon fried in mustard oil is also viruddha.

7. Potency (Vīrya viruddha)

विरूद्धं वीर्यतो ज्ञेयं वीर्यतः शीतलात्मकं । तत् संयोज्योष्ण वीर्येण द्रवेण सह सेव्यते ।।
(च.सू.२६/९३)

The dravyas having contradictory potency are taken together in *vīrya viruddha. Cilacima* variety of fish with milk.

उभयं ह्येतान् मधुरं विरुद्ध वीर्यं, विरुद्ध वीर्यत्वात् शोणित प्रदूषणाय महाभिष्यन्दत्वात् मार्गोपरोधाय च ।। (अ.सं.सू. ९/४)

Both have sweet taste, sweet (*vipāka*), but have contradictory potency, milk is cold & fish is hot in potency, so they vitiate the blood & *abhiśyandita* produces obstruction of channels & blood diseases, constipation etc.

Meat of terrestrial and aquatic animals with honey, sessame, jaggery, milk, black gram, radhish, lotus stem and sprouted pulses produce deafness, blindness, tremors, abnormality (jāḍya), indistinct speech, nasal speech, and even death.

Flesh of dove fried in mustard oil with honey and milk is also viruddha.

In take of pigeons flesh fried in mustard oil with honey & milk produce blood disorders, obstruction of channels, atherosclerosis (coating in channels), convulsion, Śankhaka a variety of head ache, enlargement in throat (thyroid), diphtheria, stiffness of neck and death.

8. Bowel (Koṣṭha viruddha)

क्रूरकोष्ठस्य चात्यल्पं मन्दवीर्यमभेदनम् । मृदुकोष्ठस्य गुरुं च भेदनीयं तथा बहुः ।।
एतत् कोष्ठ विरूद्धं । (च.सू. २६/९४-९५)

Administration of mild purgative in small dose in hard bowel person, administration of strong purgative in large dose in soft bowel person are *koṣṭha viruddha.*

9. Condition of health (Avasthā viruddha)

श्रमव्यवाय व्यायामसक्तस्यानिलकोपनम्। निद्रालसस्य भोजनं श्लेष्मकोपनम्।। (च.सू.२६/९६)

Intake of *vāta* aggravating diet by a person whose *vāta* is aggravated due to excessive exhaustion and sexual act.

Intake of *śleṣmala* diet by a person whose *śleṣma* agravated due to excess of sleep and laziness.

10. Contradictory to rules (Krama viruddha)

यच्चानुत्सृज्य विण्मूत्रं भुङ्क्ते यश्चाबुभुक्षितं। तच्च क्रमविरुद्धं स्याद्यच्चातिक्षुद्वशानुगः।। (च.सू.२६/९७)

If the person consumes food before earlier food is digested, without evacuation of faeces & urine, it is contradictory to rules.

11. Practice (Parihāra viruddha)

परिहार विरुद्धं तु वराहादिन्निषेव्य यत्। सेवेतोष्णं घृतादींश्च पीत्वा शीतं निषेवते।। (च.सू.२६/९८)

Intake of hot things after taking pork & intake of cold things after taking ghee are known as *parihāra viruddha.*

12. Defect in the process of preparation (Pāka viruddha)

विरुद्धं पाकतश्चापि दुष्टदुर्दारुसाधितम्। अपक्वतण्डुलात्यर्थ पक्वदग्धं च यद्भवेत्।।(च.सू.२६/९९)

Preparation of food having bad, wrotten odour, under cooking, over cooking & burning are considered as *pāka viruddha.*

13. Combination (Saṁyoga viruddha)

संयोगतो विरुद्धं तद्यथा अम्लं पयसा सह । (च.सू.२६/१००)

Sour substance with milk will be contradictory in combination.

14. Contradictory to mind (Hṛdviruddha)

अमनोरुचितं यच्च हृद्विरुद्धं तदुच्यते । (च.सू.२६/१००)

Any substance which is not pleasent to taste is *hṛdviruddha.*

15. Richness of quality (Sampat viruddha)

संपद्विरुद्धं तद्विद्यात् असंजात रसं तु यत् । अतिक्रान्तरसं वापि विपन्नरसमेव वा ।।
(च.सू.२६/१०१)

The food articles which are immature, over mature or putrified are considered as *sampat viruddha.*

16. Codes (Vidhi viruddha)

ज्ञेयं विधिविरुद्धं तु भुज्यते निभृते न यत् । तदेवं विधमन्नं स्याद्विरुद्धमुपयोजितम् ।।

The food taken against the rules told in *Āyurveda.*

17. Doṣa (Doṣa viruddha)

Utilization of food, which are having qualities similar to aggravated *doṣa*.

Diseases produced by intake of Viruddhāhāra

षाण्ढ्यान्ध्य वीसर्प दकोदराणां विस्फोटकोन्मादभगन्दराणां ।
मूर्छामदाध्मानगलग्रहाणां पाण्ड्वामयस्यामविषस्य चैव ।।
किलासकुष्ठग्रहणी गदानां शोथाम्लपित्तज्वरपीनसानां ।
सन्तानदोषस्य तथैव मृत्योर्विरुद्धमन्नं प्रवदन्ति हेतुम् ।। (च.सू.२६/१०२-१०३)

Sterility, blindness, *visarpa* (a type of skin disease), ascites, eruptions, insanity, fistula, unconsciousness, intoxication, flatulence, obstruction of throat, anaemia, poisoning due to *āma*, vitiligo, skin disease, sprue, oedema, hyperacidity, fever, rhinitis, foetal diseases & even death may be produced due to intake of unwhole some food.

Exceptions for viruddha–

१. लशुनं क्षीरेण पानं क्वचिन्न विरोधि । (च.पा.)

Garlic along with milk in *laśuna kṣīrapāka*,

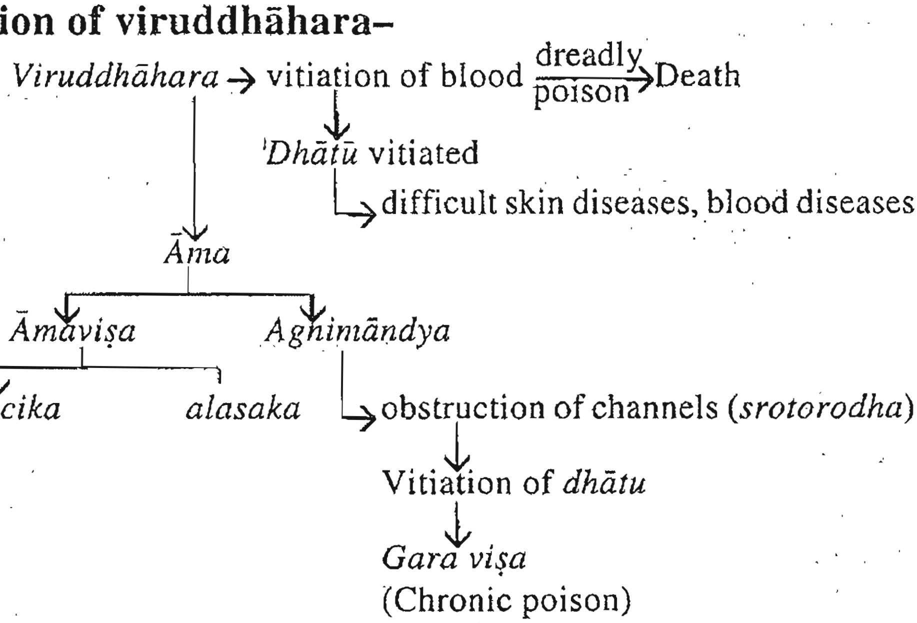
२. मूलक स्वरस क्षीरे । (च.पा.)

Radish juice along with milk.

३. मधुना उष्णेन वमनेन संयुक्तम् । (च.पा.)

Honey with hot water during emesis.

Action of viruddhāhara–



Treatment for diseases produced by viruddha

विरुद्धाशनजान् रोगान् प्रतिहन्ति विरेचनम् । वमनं शमनं चैव पूर्वं वा हितसेवनं ।।
सात्म्यतोऽल्पतया वाऽपि दीप्ताग्नेस्तरुणस्य च ।
स्निग्ध व्यायाम बलिनां विरुद्धं वितथं भवेत् ।। (च.सु. २६/१०५-१०६)

Diseases produced by unwholesome food, can be treated with the help of purification therapy, especially emesis & purgation, also palliative therapy & wholesome diet. One who consumes *viruddhāhāra* regularly in small quanlities will lead to *okasātmya.*

Viruddhāhāra donot have any effect on young people, whose *agni* is strong, after oleation or person practicing exercise regularly.

व्यायामं कुर्वतो नित्यं विरुद्धमपि भोजनम् । विदग्धं अविदग्धं वा अविदोषं परिपच्यते ।।
(सु.चि.२४/४४)

If one who does exercise daily consumes *viruddhāhāra*, it gets digested without any difficulty properly.

व्यायामस्निग्ध दीप्ताग्निः वयस्थ बलशालिनां । विरोध्यपि न पीड्यै सात्म्यमल्पं च भोजनं ।।
(अ.हृ.सू.७/४७)

One who does exercise, consumes unctous food, whose agni is strong, young strong, habituated to *viruddhāhāra* & consume *viruddha* in small quantities, will not be afflicted by *viruddha.*

Effects of Viruddha

विरुद्धमपि च आहारं विद्यात् विषगरोपमम् ।। (अ.हृ. ७/२९)
सद्योनाशकत्व–मत्स्यनिस्तालित स्नेहसाधित पिप्पली

Viruddhāhāra act as acute poison & chronic poison, producing instantaneous & delayed effects.

व्याधिमिन्द्रियदौर्बल्यं मरणं चाधिगच्छति। विरुद्ध रसवीर्याणि भुञ्जानोनात्मवान्नरः।। (सु.सं.२०/१९)

Consumption of *viruddhāhāra* produces disease, weakness of sense organs, & even death.

Modern correlation

Allergy & Intolerance can be correlated with *Viruddha.*

Allergy

Allergy is altered reactivity or changed reaction. It includes development of immunity to infection on one hand and marked reaction to certain food stuffs, pollen, insect stings on the other hand.

Principally immune system is concerned. Environment ie all external things that effect the body, food, water, air & things that come in contact with skin can cause allergy.

Chemical allergy reactions

Anaphylactic shock, swelling of lips, mucous membrane, tongue, urticaria, vomiting and in severe cases collapse occurs due to allergic reaction.

Allergic disorders

Hay fever, asthma, nonseasonal or permanent rhinitis, urticaria, eczema etc.

The IgE antibody is the main factor in classical allergic conditions. Special immune cells mast cells act on them. IgE is found bound with their specific antigen & stimulate the mast cell to release several chemical messengers.

Tests for food allergy

positive skin prick test

– later (Radio allergo adsorbent test) RAST

Food intollerance

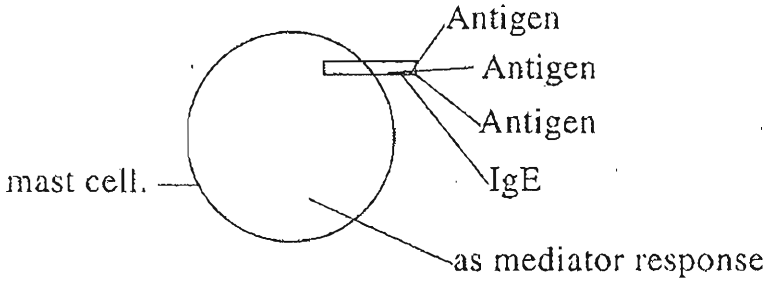
– skin prick test & other tests are negative.

Symptoms of food intolerance

- Head ache	- in children recurrent mouth ulcers
- Migraine	- aching muscles
- fatigue	- vomiting
- depression	- stomach ulcers
- Anxiety	- duodenal ulcers
- Hyperacidity	- crohn's disease
- Diarrhoea	- joint pain, rheumatoid arthritis
- irritable bowel Syndrome	- edema
- constipation	
- wind bloating	

Mechanism–

B cells (lymphocytes) produce IgE, these attach to mast cells in the body tissue.



Chemical histamine is produced. As a response to this smooth muscles contract. Antigens are the molecules, which provoke body to produce antibodies. Heptanes are the small molecules of antigen, which combine with proteins in the body & produce eosinophils. Eosinophils are predominant in allergic conditions.

Marked food allergy

Adoptation is failure of organism to adopt to the envinonment.

Allergy is appropriate & harmful response of immune system to normally harmless substance.

Food intolerance

Immediate	Late	Immune complex delayed hypersensitivity	आयुर्वेद

1. GIT

Nausia	stomach ulcer	Entero colitis	अरोचक
Vomiting	duodenal ulcer		धर्दि
diarrhoea	crohn's disease	gluten sensitivity	अजीर्ण
wind bloating	IBS.	enteropathy	आध्मान
Hyperacidity			यकृत प्लीहोदर
constipation			ग्रहणी

2. Respiratory

Rhinitis	Eosinophilia	पीनस
Laryngeal oedema		कण्ठरोग
Asthma		श्वास

3. Cuteneous

Urticaria	Eczema	पीनस
Dermatitis		किलास
Angio oedema		कुष्ठ

4. Neurological

Migraine, Anxiety, depression, headache   उन्माद मद

Āyurveda emphasizes on the prohibition of incompatible food intake for the protection of health. If we analyse the viruddhas mentioned in our classics, it appears that these combinations are difficult to digest, or in other words decrease the Agni and lead to formation of Āma, which inturn lead to obstruction of channels. Thus they produce various acute or chronic diseases depending on the nature of the combination, persons body constitution and quantity and duration of consumption of incompatible substance.

Scientific explanation

1. The enzyme ptyalin helps in the digestion of carbohydrates & starches, but in presence of sour materials and acidic medium, this action is hampered and results in fermentation. So only carbohydrates should not be consumed in combination with sour fruits which have citric, malic & oxalic acids.

2. Rich animal and vegetable proteins should not be consumed together. This again is very heavy and difficult for digestion.

3. High protein foods processed in concentrated fat substances should be avoided, because the fats decrease the secretion of gastric juices and hamper the digestion process. Researches have proved that heavy fat diet may reduce digestive rate by 50%.

4. Intake of milk with heavy meals and non vegetarian diet is contra indicated, as milk is a gastric insulator and hampers the digestion process.

Disease due to over Nourishment (Santarpaṇottha roga)

सन्तर्पयति यः स्निग्धैर्मधुरैर्गुरुपिच्छिलैः । नवान्नैर्नवमद्यैश्च मांसैश्चानूपवारिजैः ।।
गोरसैर्गौडिकैश्चान्नैः पैष्टिकैश्चातिमात्रशः। चेष्टाद्वेशि दिवास्वप्न शय्यासन सुखे रतः।।
रोगस्तस्योपजायन्ते सन्तर्पणनिमित्तजाः ।(च.सू.२३/३-७)

One who consumes excess of unctous, sweet, heavy, slimy substance, newly harvested rice, fresh wine, meat of marshy & aquatic animals, milk products, food preparations made of sugar, who avoids physical exercises, sleeps in day time, always lies in bed and sits at single place gets afflicted with diseases due to *santarpaṇa* (over nourishment).

Diseases produced by santarpaṇa

प्रमेहपिडकाकोठकण्डूपाण्ड्वामय ज्वराः । कुष्ठान्यामप्रदोषश्च मूत्रकृच्छ्रमरोचकः ।।
तन्द्राक्लैब्यमतिस्थौल्यमालस्यगुरुगात्रता । इन्द्रियस्त्रोतसां लेपो बुद्धेर्मोहः प्रमीलकः ।।
शोफश्चैवंविधाश्चान्ये शीघ्रमप्रतिकुर्वतः ।। (च.सू. २३/५-७)

Obstinate urinary disorders, blisters, urticaria, itching, anaemia, fever, skin diseases, diseases due to *āma* like *alasaka* & *visūcika,* dysuria, anorexia, drowsiness, sterility, obesity, laziness, heaviness of the body, coating of sense organs and channels, delusions, always concentrating one object & edema are produced very fast by over nourishment.

Vāgbhaṭa includes *visarpa* a variety of skin disease, abscess, splenomegaly, stiffness of limbs (*urustaṁbha*) & diseases of head & throat under the diseases produced by over nourihment.

Treatment of disease due to over nourishment

शस्तमुल्लेखनं तत्र विरेको रक्तमोक्षणं । व्यायामश्चोपवासश्च धूमश्च स्वेदनानि च ।।

Scraping (*lekhana*), purgation, blood letting, exercise, fasting smoking & sudation are some of the measures.

स क्षौद्रश्चाभया प्राशः प्रायो रूक्षान्नसेवनम् । चूर्ण प्रदेहा ये चोक्ताः कण्डूकोठविनाशनाः ।।
त्रिफलारग्वधं पाठां सप्तपर्णं स वत्सकं । मुस्तं समदनं निम्बं जलेनोत्क्वथितं पिबेत् ।।
तेन मेहादयो यान्ति नाशमभ्यास्यती ध्रुवम् । मात्रा कालप्रयुक्तेन सन्तर्पण समुत्थिताः ।।
मुस्तारग्वधः पाठा त्रिफला देवदारू च । श्वदंष्ट्रा खदिरो निम्बो हरिद्रे त्वक् च वत्सकान् ।।
रसमेषा यथादोषं प्रातः प्रातः पिबेन्नरः। सन्तर्पण कृतैः सर्वैर्व्याधिभिः संप्रमुच्यते।।(च.सू.२३/८-१३)
एभिश्चोद्वर्तनोध्दर्ष स्नानयोगोपयोजितैः। त्वग्दोषाः प्रशमं यान्ति यथा स्नेहोपसंहितैः।।(च.सू.२३/१४)

3. *Haritaki* (Terminalia chebula linn) with honey, intake of food having dry properties like *barley*, application of powders & anointments which destroy itching & urticaria.

4. Decoctions of *triphala* (Terminalia chebula Linn, Terminalia Belerica roxb & Emblica officinalis gaert), *Āragvadha* (Cassia fistula linn.), *pāthā* (Cissampelos pareira linn), *saptaparṇa* (Alstonia

scholaris R.Br.), *Vatsaka* (Holerrhena antidysenterica wall), *musta* (Cyperus rotundus Linn.). *Madana* (Randia dumetorum Linn.) & nim̐ba (Azadirachta indica A Juss), when consumed according to dose, time & condition, it cures diseases produced by over nourishment including urinary diseases (*prameha*).

Daily intake of juices of–

5. *Musta* (Cyperus rotundus linn), *Āragvadha* (Cassia fistula linn), *pāṭhā* (Cissampelos pareira linn), *triphala* (Terminalia chebula linn, Terminalia belerica Roxb & Emblica oficinalis Gaertn), *devadaru* (Cedrus deodara loud), *śwadam̐ṣṭra* (Tribulus terrestris linn), *khadira* (Acassia catechu willd), *nim̐ba* (Azadirachta indica A. juss), *haridra* (Curcuma longa linn). *dāruharidra* (Berberis aristata D.C.) & bark of *vatsaka* (Holarrhena antidysentrica wall) cures diseases due to over nourishment.

6. Above mentioned drugs mixed with oil or ghee & applied followed by massage or otherwise will cure the skin diseases.

7. Sassuria lappa C.B. clarke (*Kuṣṭha*), bile of ox (*Gomedaka*) Faerula Northex Boiss (*Hiṅgu*), bone of *Krauñca*, Piper longum linn (*pippali*), Piper nigrum linn (*marica*), Acorus culamus linn (*vacā*), Adhatoda vasaka nees (*vāsā*), Tribulus terrestris linn (*śvadam̐ṣṭra*). *Kharāhva* (Trichispermum roxburghianum), *aṣmabheda* (Bergenia ligulat) along with butter milk, supernatent part of curds (*dadhi mastu*) and juice of Zizipus jujube lam (*badara*) cure obstinate urinary disorders & dysurea.

8. Combination of butter milk & Terminalia chebula linn, Terminalia belerica roxb, Emblica officinalis Gaertn (*Triphala*), usage of medicated alcoholic perparations pacify urinary diseases etc.

Mantha (thin gruel) prepared of Piper longum linn, Piper nigrum linn, Zinziber officinale (*Trikaṭu*) Terminalia chebula linn, Terminalia belerica roxb & Emblica officinalis Gaertn (*Triphala*) with honey Embelia ribes (Burm.f. *(viḍiṅga), Ajamoda* (Trichispermum Roxburghianum), roasted corn flour, oil & decoction of Aquleria Agalocha roxb (*agaru*) is also useful Piper longum

linn, Piper nigrum linn, Zinziber officinale rosc (vyoṣa) Embelia ribes (*viḍaṅga*) seeds of Moringa oliefra lam (*śigruṇi*), Terminalia chebula linn, Terminalia belerica roxb, Emblica officinalis Gaertn (*triphala*), Picrorrhiza kurrua royle (*kaṭurohiṇi*), solanum indicum linn (*Bṛhati*), solanum xanthocarpum (*Kanṭhakārī*), curcuma longa linn (*Haridra*), Berbaris aristata DC. (*Dāruharidra*), Cissampelas pareira linn (*pāṭhā*), Aconitum heterophyllum (*Ativiṣa*), Desmodium gangeticum DC (*sthirā*) Ferula narthex Boiss (*hiṅgu*), (*kebukamūla*) Trichyspermum ammi sprague (*yavāni*), Coriandrum sativum (*Dhānyaka*), Plumbago zeylenca linn (*citraka*), *sauvarcala* salt, Cuminum cyminum linn (*jīraka*) and Juniperus communis linn (*hapuṣa*) powders mixed with equal quantity of sessume oil, ghee & honey taken along with 16 parts of roasted corn flour & water is useful in Diabetes mellitus, *vāta* disorders, piles, jaundice splenomegaly & anaemia.

कुष्ठं गोमेदको हिङ्गु क्रौञ्चास्थि त्र्यूषणं वचा । वृषकैले श्वदंष्ट्रा च खराह्वा चाश्मभेदकः ।।
तक्रेण दधिमण्डेन बदराम्लरसेन वा । मूत्रकृच्छ्रं प्रमेहं च पीतमेतव्द्यपोहति ।।
तक्राभयाप्रयोगैश्च यान्ति मेहादयः शमम् । त्रिफलायास्तथैव च अरिष्टानां प्रयोगैश्च त्र्यूषणं त्रिफला क्षौद्रं क्रिमिघ्नमजमोदकः ।। मन्थोयं सक्तवस्तैलं हितोलोहोदकोप्लुतः । व्योषं विडङ्ग शीग्रुणि त्रिफलां कटुरोहिणीम् । बृहत्यौ द्वे हरिद्रे द्वे पाठामतिविषां स्थिराम् ।। हिङ्ग केबूकमूलानि यवानि धान्य चित्रकान् । सौवर्चलं अजाजीं च हपुषां चेति चूर्णयेत् । चूर्ण तैल घृत क्षौद्र भागाः स्युर्मनतः समाः । सक्तूनां शोडष गुणो भागः सन्तर्पणं पिबेत् ।। (च.सू. २३/१५-२१)
व्यायामनित्यो जीर्णाशी यवगोधूम भोजनः । सन्तर्पणकृतैर्दोषैः स्थौल्यं मुक्त्वा विमुच्यते।।
(च.सू.२३/२५)

Performing exercise daily, intake of food like barley & wheat, after feeling of hunger cure the disorders due to over nourishment & obesity.

Diseases due to nutritional deficiency
(Apatarpaṇottha roga)

देहाग्निबलवर्णौजः शुक्रमांसपरिक्षयः । ज्वरः कासानुबन्धश्च पार्श्वशूलमरोचकं ।।
श्रोत्रदौर्बल्यमुन्मादः प्रलापो हृदयव्यथा । विण्मूत्रसंग्रहः शूलं जङ्घोरुत्रिक संश्रयम् ।।
पर्वास्थि सन्धिभेदश्च ये चान्ये वातजा गदाः। ऊर्ध्ववातादयः सर्वे जायन्ते तेऽपतर्पणात् ।।
(च.सू.२३/३६-४०)

Emaciation of the body, reduction in the power of digestion, strength, complexion, *ojas*, semen, muscle tissues, continuous fe-

ver, cough, pain in the chest, anorexia, weakness in the power of hearing sounds, insanity, pain in cardiac region, obstruction to passage of stools & urine, pain in calf, thigh & lumbar region, pain in fingers, bones & joints and other diseases due to vitiation of *vāta* like *ūrdhva vāta* are produced due to under nourishment.

सद्यः क्षीणो हि सद्यो वै तर्पणेनोपचीयते । नर्ते सन्तर्पणाभ्यासः चिरक्षीणस्तु पुष्यति ।।
देहाग्निदोष भैषज्यं मात्राकालानुवर्तिना । कार्यमत्वरमाणेन भेषजं चिरदुर्बले ।।

(च.सू.२३/३१-३२)

One who suffers from acute emaciation should be given *sadya santarpaṇa* & one who suffers for chronic emaciation should be administered habitual *santarpaṇa* therapy.

In case of chronic emaciation *santarpaṇa* therapy should be given slowly, depending on temperament (*prakṛti*), *Agni* (digestive fire), *doṣa, kāla* (time) & quantity (*mātrā*).

हितामांसरसास्तस्मै पयांसि च घृतानि च । स्नानानि बस्तयोभ्यङ्गस्तर्पणास्तर्पणाश्च ये ।।

(च.सू.२३/३३)

For such patients meat soup, milk, ghee, bathing, unctous enema & massage are conducive.

ज्वरकासप्रसक्तानां कृशानां मूत्रकृच्छ्रिणां । तुष्यतामूर्ध्ववातानां वक्ष्यन्ते तर्पणा हिताः ।।
शर्करा पिप्पलीतैलघृतक्षौद्रं समांशकैः । सक्तु द्विगुणितो वृष्यस्तेषां मन्थः प्रशस्यते ।।
सक्तवो मदिरा क्षौद्रं शर्करा चेति तर्पणं । (च.सू. २३/३४-३६)

In case of person suffering from fever, emaciation, dysurea & *ūrdhva vāta, tarpaṇās* (nourishing drinks) are beneficial.

Mantha prepared of sugar, Piper longum linn (*pippali*), ghee, oil & honey in equal proportions is benefical, when taken along with double the quantity of *saktu* (roasted corn flour).

फाणितं सक्तवः सर्पिर्दधिमण्डोऽम्लकाञ्जिकम् । तर्पणं मूत्रकृच्छ्रघ्नं उदावर्तहरं पिबेत् ।।
मन्थः खर्जूरमार्द्वीक वृक्षाम्लाम्लिक दाडिमैः। परुषकैः सामलकैर्युक्तो मद्यविकारनुत् ।।

(च.सू.२३/३७-३८)

स्वादुरम्लो जलकृतः सस्नेहो रूक्ष एव वा । सद्यः सन्तर्पणो मन्थः स्थैर्यवर्ण बलप्रदः।।
अम्ल इति अम्ल दाडिमादि योगात् अत्र रूक्षसक्तुकृतस्यापि मन्थस्य द्रवत्व शैत्य दाहानुसारित्व सद्य सन्तर्पकत्वं भवत्येव ।। स्नेहादि बृहणद्रव्ययोगात्तु कालान्तर तर्पकत्वं इति भवति । (च.पा.)

1. Drinks prepared of *saktu*, alcohol, honey & sugar helps in proper elimination of faeces, urine, *vāta, pitta & kapha.*

2. *Phaṇita* preparation of sugar candy, salts, ghee, supernatent part of curds, sour fermented product of rice (*amla kāñjika*) are given in diseases & *ūdāvarta* a variety of *vāta* disorder. *Mantha* prepared of Phoenix sylvistris (*kharjūra*), Vitis venifera (*drākṣa*), Garcenia indica Ehois (*Vṛkṣāmla*), Tamarindis indica linn (*ciñcā*), Punica granatum linn (*dāḍima*), Grevia asiatica linn (*paruṣaka*) and Emblica officinalis Gaertn (*āmalaki*) are given in intoxications due to alcohol (*madātyāya*).

3. *Mantha* prepared of sweet, sour taste with water, act as instant nourishing agents (*sadya santarpaka*) & enhance strength complexion & energy, sour things like punica granatum linn (*dāḍima*) and Grevia asiatica linn. (*paruṣaka*) are used in *mantha*. *Mantha* prepared of dry things like *saktu* are also nourishing (*santarpaka*) due to the liquid, cold & soothening nature.

If unctous & *bṛṁhaṇa* drugs are used, then they will be *kālāntara santarpakas*.

Chapter- 9

THE QUANTITY OF FOOD AND NUTRITION

Man is what he eats, *Kāśyapa* opines that, health is dependent on food.

आरोग्यं भोजनाधीनम् ।। (का.सं.खि)

He also considers food as *Mahābheṣaja*. The quantity of food is also very important, along the different components of the food. It is emphasised in *Trividha kukṣīya* chapter & also in the eight types of special considerations while taking food, where it is considered under *Rāśi* ie Sarvagraha, which can be compared to total calorific intake & *parigraha* ie quantity of each of the components like macro nutrients & micronutrients specifically.

Nutrition may be defined as "the science of food & its relationship to health". Nutrition can be classified into human nutrition, clinical nutrition & public health nutrition, they deal with individual humans, therapeutic aspects & community aspects respectively. Nutrient or 'food factor' is the word used for specific components, like proteins, vitamins & minerals. Assessment of nutritional status of communities, survey, monitoring, treatment & rehabilitation about nutritions is known as nutritional epidemiology.

Classification of food

1. Based on origin 1. Animal origin food, 2. Plant origin food

2. Based on chemical components

1. Proteins 2. Fats 3. Carbohydrates
4. Vitamins 5. Minerals

Based on functions

1. Body building foods Ex. milk, meat, poultry, fish, eggs, pulses etc, which are major sources of proteins.

2. Energy giving foods Ex. cereals, sugars, roots, tubers, fats & oil, which are usually sources of carbohydrates & fats.

3. Protective food Ex. Vegetables, fruits, milk, which are the major sources of vitamins & minerals.

3. Based on food groups

1. Cereals & millets
2. Pulses
3. Vegetables
4. Nuts & oilseeds
5. Fruits
6. Animal foods
7. Fats & oils
8. Sugar & Jaggery
9. Condiments & spices
10. Miscellaneous foods.

The necessary ingredients of food

Nutrients are organic & inorganic complexes contained in food, which are necessary for the body growth, development & maintenance. Food supply 50 different nutrients. They are divided into two major catagory.

1. Macro nutrients

These are proteins, fats & carbohydrates, which form major portion of food that is consumed, so also known as 'proximate principles'.

In the indian diet following proportion is observed.

Nutrient	% of Energy derived
Proteins	7-15%
Fats	10-30%
Carbohydrates	65-80%

Micro nutrients

These are vitamins & minerals, which are required for the body in very minute amounts, so known as micronutrients.

Ideal food

Ideal food is nothing but the food which is necessary for maintenance of health, proper body growth & development. It is also described as balanced diet. A balanced diet is defined as "one which contains variety of foods in such quantities & proportions that the need for energy, amino acids, vitamins, minerals, fats, carbohydrates and other nutrients is adequately met for maintaining health, vitality & general well being and also makes a small proportion for extra nutrients to with stand short duration of leanness".

The concept of balanced diet was also mentioned in *caraka saṁhitā,* under things which are always conducive for health & should be consumed regularly for the maintenance of health.

षष्ठिकान् शालिमुद्गान् सैन्धवामलके यवान् । अन्तरीक्षं पयः सर्पिः जाङ्गलां मधुचाभ्यसेत् ।।
तच्च नित्यं प्रयुञ्जीत स्वास्थ्यं येनानुवर्तते । अजातानां विकाराणां अनुत्पत्तिकरं च यत् ।।
(च.सू.५/१२-१३)

One should take *ṣaṣṭhika* (a variety of rice), *śāli* (Oriza sativa linn), green gram (Phaseolus radiatus linn), rock salt, goose berry (Emblica officinalis Gaertn), rain water, milk, ghee, meat of animals residing in dry land, (Hordeum vulgare) barly & honey regularly. These should be consumed daily for maintenance of health & prevention of diseases.

Here *śāli, ṣaṣṭhika, yava* & madhu can be releted with carbohydrates, *mudga, jāṅgala maṁsa rasa, & payah* to proteins, *sarpi* for fats, *āmalaka* for vitamins & *saindhava* for minerals. These are only representatives, wide range have been mentioned under *sūtra sthāna* 25th chapter as conducive foods. These can also be considered for daily intake.

Its quantity have been mentioned under *kautilya's Artha śāstra* as follows.

Rice	*1 prastha*	640 g
Pulse	1/4th of rice	160 g
Salt	1/16th of pulse	10 g
fat	1/4 of pulse	40 g
meat	*20 palās*	960 g
curds	*1/2 prastha*	320 g
fresh vegetable	1/2 times of meat	*30 pala*. 1440g.

He considers ideal food as *ārya bhakta*.

शीलयेच्छालिगोधूमयव षष्ठिकजाङ्गलम् । सुनिषण्णक जीवन्तीबालमूलकवास्तुकम् ।।
पथ्यामलकमृद्वीकापटोलीमुद्गशर्करा। घृतं दिव्योदकं क्षीरक्षौद्रदाडिमसैन्धवम्।।(अ.सं.सू.१०/१८-१९)

The daily intake of following food are conducive for health. rice, wheat, barley, rice occuring in 60 days, meat of animals of desert, vegetables like *sunisaṇṇaka, jīvanti*, tender *mūlaka* (Raphanus sativus), *vāstūka, pathya* (Terminalia chebula linn), *āmalaka* (Emblica officinalis Gaertn), *mṛdvīka* (Vitis vinefra linn), *paṭola* (Trichosanthus doica roxb), mudga (Phaeolus radiatus linn), *śarkarā* (sugar), ghee, rain water, milk, honey, *dāḍima* (Punica granatum linn) & *saindhava* (rock salt).

Proteins

Proteins are of prime importance in human nutrition. They are complex organic substances containing carbon, hydrogen, oxygen, nitrogen and sulphur in different amounts.

About 20% of body weight in adult is by proteins. They are made up of smaller units called amino acids.

1. Essential amino acids are not manufactured in the body.
2. Non essential amino acids are manufactured in the body.

Essential aminoacids (EAA)

Nine aminoacids are not synthesized in the body, which should be obtained from diet.

Leucine, isoleucine, lysine, methionine, phenylalanine, threnine, valine, tryptophan and histidine, are considered as essential amino acids.

Nonessential aminoacids

15 aminoacids can be synthesised in the body. They include arginine, asparaginic acid, serine, glutamic acid, proline & glycine.

Aminoacids are required to synthesise tissue proteins.

A protein is said to be 'Biologically complete', if it contains all EAA in amounts required to human body.

Animal proteins are high of quality compared to vegetable proteins with respect to nutrition. Ex: milk & Egg are most suitable for most of the humans.

Nicotinic acid mg/day	Pyridoxin mg/day	Ascorbic acid mg/day	folic acid µg/day	Vit B_{12} µg/day
16 18 21	2	40	100	1
12 14 16 +2 +3	2 2.5 2.5	40 40 80	100 400 150	1 1 1.5
710µg/kg 650µg/kg	0.1 0.4	25	25	0.2
8 11 13	0.9 1.6	40	30 40 60	0.2-1
15 13	1.6	40	70	0.2-1.0
16 14	2.0	40	100	0.2-1.0
17 14	2.0	40	100	0.2-1.0

Food according to classification of Age, occupations, pregnancy & children. (RDA for Indians)

Group	Particulars	body weight	Net Energy kcal/day	Protein g/day	Fat g/day	Calcium mg/day	Iron mg/d	VitA µg/d Reti-nol	VitA µg/d Bca-rotene	Thiamine	Ribo flavin
Man	sedantary work		2425							1.2	1.4
	moderate work	60	2875	60	20	400	28	600	2400	1.4	1.6
	Heavy work		3800							1.6	1.9
Woman	sedantary work		1875							0.9	1.1
	moderate work	50	2225	50	20	400	30	600	2400	1.1	1.3
	Heavy work		2925							1.2	1.5
	Pregnant women	50	+300	+15	30	1000	38	600	2400	+0.2	+0.2
	Lactating										
	0-6 months	50	+550	+25	45	1000	30	950	3800	+0.3	+0.4
	6-12 months		+400	+18						+0.2	+0.2
Infants	0-6 months	5.4	108/kg	2.05/kg		500		350	1200	55µg/kg	65µg/kg
	6-12 months	8.6	96/kg	1.65/kg						50µg/kg	60µ/kg
Children	1-3 yrs	12.2	1240	22			12	400	1600	0.6	0.7
	4-6 yrs	19	1690	30	25	400	18	400	1600	0.9	1.0
	7-9 yrs	26.9	1950	41			26	600	2400	1.0	1.2
Boys	10-12 yrs	35.4	2190	54	22	600	34	600	2400	1.1	1.3
Girls	10-12 yrs	31.5	1970	57			19			1.0	1.2
Boys	13-15 yrs	47.8	2450	70	22	600	41	600	2400	1.2	1.5
Girls	13-15 yrs	46.7	2060	65			28			1.0	1.2
Boys	16-18 yrs	57.1	2640	78			50	600	2400	1.3	1.6
Girls	16-18 yrs	49.9	2060	63	22	600	30			1.0	1.2

(Curtecy preventive & social medicine K. Park.)

Functions

1. Body building– Maintenance action is more compared to body building, except in young child & infant.

2. Proteins are responsible for repair & maintenance of body tissues.

3. Maintenance of osmotic pressure is done by proteins.

4. Substances like antibodies, plasma proteins, haemoglobin, enzymes, hormones & co-agulation factors are synthesised by proteins.

5. Immune mechanism of body, cell mediated immune response & bactericidal activity of leucocytes are lowered in PEM.

Sources

Animal sources- milk, meat, egg, cheese, fish

Egg is the best among food proteins, because of its known high biological value & digestibility. It is called as "Reference protein"

Vegetable sources– Pulses (legumes), cereals, beans, nuts, oil seed cakes.

Complementary action of proteins

Cereal proteins donot contain lysine & threonine and pulse proteins donot contain methionine, which are known as limiting amino acids. If two or more vegetable foods are taken together, their proteins support one another & supply proteins equivalent to animal proteins.

Ex: Rice-dal, chapati-dal, Kichadi, Bisibele bath.

Protein Metabolism

1. Proteins can not be stored in the body, they have to be replaced every day.

2. The process of breaking down of proteins into aminoacids & reutilization in protein synthesis is constant.

3. Rates of replacement vary from tissue to tissues.

4. About 2% of body proteins are replaced in adult body every day.

5. Amount & pattern of specific proteins is maintained constant.

Measurement of protein

Protein quality is assessed in comparison with reference protein.

1. Aminoacid score

$$\text{Amino acid score} = \frac{\text{number of mg of aminoacid per gm of protein}}{\text{number of mg of same A.A. per gm of egg protein}} \times 100$$

score is 50-60 for starches & 70-80 for animal foods.

2. Net protein utilization (NPU)

$$NPU = \frac{\text{Nitrogen retained in the body}}{\text{nitrogen intake}} \times 100$$

It is the product of digestibility coefficient & biological value divided by 100. (1 gm of protein = 6.25 g of Nitrogen)

NPU α1/protein requirement

Protein quantity– Protein Energy ratio

$$PE\% = \frac{\text{Energy from protein}}{\text{Total energy in diet}} \times 100$$

Assessment of protein nutritional status

Test – Arm muscle circumference
– circumference height index
– serum albumin
– serum transferin
– total body nitrogen.

Best measure is serum albumin.

– more than	3.5 g/dl	-	normal
	3.5 g/dl	-	mild
	3 g/dl	-	severe

Protein requirements

1g/kg body weight/day for an Indian adult–

Infants	0-3 months	2.3 g/kg body wt/day
	3-6 months	1.8 g/kg body wt/day
	6-9 months	1.65 g/kg body wt/day
	9-12 months	1.5 g/kg body wt/day

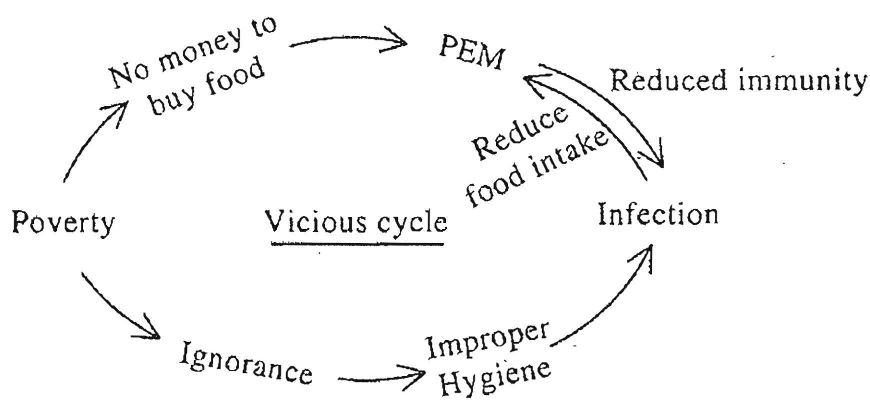
Children	1-3 months	1.52 g/kg body wt/day
	4-6 months	1.68 g/kg body wt/day
Pregnancy	1g/kg body weight/day + 15	
lactation	1g/kg body weight/day + 25	

Protein energy Malnutrition

Most improtant Problem– It is one of the health & nutrition problem in India and important cause of childhood mortality & morbidity & permanent physical disability.

Causes– 1. Less intake of food. It is both 'protein gap' & food gap in quality & quantity.

2. Infections like diarrhoea, respiratory infections, measles, intestinal worm.



Social factors– Poor environmental conditions
Large family size
low economic status

Classification–

1. Marasmus– more common
2. Kwashiorkor
3. Marasmic kwashiorkor

Marasmus

Moderate malnourishment

Adaptation– diets are utilized more effeciently & nitrogen excretion in urine & stools are reduced. If food deficit persists for longer period, to conserve energy children become slow & less

energetic. If the deficit continues growth retardation occurs. Lag is pronounced in weight than in height.

If deficit persists height also becomes stunted. Body appears disproportionate with long body, thin limbs, unduly large head, buttocks flattened with wrinkling of skin over the front of thighs; scapulae look winged. As the deficit exaggarates, onset of infection, either onset of marasmus or kwashiokor take place.

Marasmus

Emaciation is marked with less than 60% of expected weight. Adipose tissue are severely depleted to provide energy. Atrophic muscles are evident below thin & wrinkled skin. Buccal pad of fat is last to disappear. Skin appears dry, inelastic & prone for infections and hair hypopigmented.

Abdomen is distended due to wasting, hypotonia of abdominal wall muscles and bacterial fermentation of unsplit sugars in colon. Midarm circumference is reduced, bony points appear unduly prominent, baby appears irritable and may show severe appetite.

Kwashiorkor

Marked growth retardation, edema of dependent parts, oedema, in lower extremeties, later upper limbs and face are present. The upper limbs are wasted and lower limbs are swollen.

The face is moon shaped & puffy and trunk effected to lesser extent, edema precipitated by debilitating diseases like diarrhoea & measles. Child is lethergic, listless apathetic with little interest in environment, toys, play etc. Appetite is impared, so difficult to feed orally. Hair is thin, dry, brittle, devoid of shining and reddish brown in colour. Child often suffers form diarrhoea, respiratory & skin infections. Some time liver may be enlarged, skin is dry and hyperkeratotic.

Treatment

Grading 1– mild– 75-90% of expected weight–with diet
2– moderate–60-74% of expected weight–domiciliary
3– severe– less than 60% of expected weight-hospitalization.

Moderate– 150 cal/kg/day } 8-10% of energy should be derived from
severe– 200 cal/kg/day } proteins of higher biological value

In the beginning milk based diet may not be tolerated by some children.

Preventive measures

Health promotion

1. Measures to pregnant & lactating women in the form of nutritional programmes, health education, immunization & promotion of breast feeding.

2. Adopting low cost weaning foods & improvement of family diet.

3. Proper management of money, nutrition education, family planning measures & environment sanitation play key role.

Specific preventive measure

1. Child's diet should be rich in proteins and energy

2. Immunization. 3. Fortification of food.

Early diagnosis & treatment

1. Provide surviellance 2. Early diagnosis of growth retardation

3. Early diagnosis & treatment.

Fats

Fats are solids at 20^{0}C, oils are liquids at the temparature. They are rich sources of energy. 10-15% of body weight is contributed by fat.

Classification

Depending upon synthesis

- Essential fatty acids (EFA).
- Non essential fatty acids.

Depending upon sources

- Animal fats
- Vegetable fats
- Other sources

Depending on visibility

- Visible fats - Eg. ghee, fat, oil
- Invisible fats - Eg. cereals, pulses, nuts, eggs, milk etc.

Depending on constituents

- Simple lipids e.g. triglycerides
- Compound lipids e.g. phospholipids
- Derived lipids e.g. cholesterol.

Fats are broken down in to fatty acids ultimately. They are classified into two types.

Saturated fatty acids– Luric acid, palmitic acid.

Unsaturated fatty acids– Mono unsaturated fatty acids e.g. oleic acid. Poly unsaturated fatty acids e.g. linoleic acid, linolenic acid.

Functions of fats

1. They are high energy yielding foods. i.e. 9 kcal for every gram & also act as reserve store of energy in the body.
2. They prevent the usage of proteins for energy.
3. They act as vehicles for fat soluble vitamins.
4. They support the vital body viscera like heart, kidney & intestines.
5. Fat is good insulator thus protects from cold.
6. Makes the food tasty.
7. Responsible for structural integrity of the cell memberane & reduced platelet addhesion.
8. Diets rich in EFA help to reduce serum cholesterol & low density lipoproteins.
9. PUFA are precursors of prostaglandins, which help in maintaining homeostasis, kidney function, acid secretion in stomach, gastro intestinal motility, lung physiology & reproduction.
10. Cholesterol is essential constituent of membranes & nerve tissue & precursor for synthesis of steriod hormones & bile acids.

Sources

Animal origin– ghee, butter, milk, cheese, eggs, meat, fish.

Vegetable origin– ground nut oil, mustard oil, sesame oil coconut oil etc.

Others– invisible fats in cereals, pulses, nuts & vegetables.

Essential fatty acids (EFA)

Essential fatty acids cannot be synthesized by the body, which should be present in the food. Most important is linoleic acid.

Visible & invisible fats in diet

Fats which are visible to the eye are visible fats. Ex. oil, ghee, butter etc. Fat that are present in the food articles, which are not visible to the eyes are invisible fats. Ex. cereals, pulses, nuts, milk, egg etc.

Diseases related with fat

Diseases due to excess of fat

Obesity- Diet rich in fat ,genetic trait, endocrinal anomaly etc lead to obesity. Especially consumption of fatty, oily food & sedentary life style leads to obesity.

Coronary heart diseases– Large quantity of intake of fat 40%, especially saturated fatty acids act as risk factor for development of CHD. Saturated fatty acids lead to increase of LDL & VLDL & intake of unsaturated fatty acids reduces HDL, which is protective against atherosclerosis, which is major cause for CHD. Similar thing have been mentioned under *santarpaṇottha* diseases, as *Srotasaṁlepa* which can be taken as *Dhamani praticaya, kapha nānātmaja vyādhi*. Both these conditions can be correlated with atherosclerosis. Incidence of cancer of colon & breast is high in persons who consume high fat diet.

Deficiency of essential fatty acids

Phrenoderma– Disease produced due to deficiency of essential fatty acid.

Features– Rough & dry skin condition effecting mostly lateral aspects of limbs. Phrenoderma means toad skin. Horny papular rashes are formed on posterior & lateral aspects of the limbs, back & buttocks.

Treatment– It is cured rapidly by administration of linseed or safflower oil along with vitamin B complex group.

Required Daily Allowance (RDA)

20-30% of total dietary energy should be from fats. In that 50% should be from vegetable oils.

Carbohydrates

Third important component of food is carbohydrate. In India it is the main source of energy. It provides 4 kcal/gm.

Sources of carbohydrates– Rice, wheat, jowar etc

- starch
- sugars
- cellulose

Functions

1. Provides energy to the body.
2. Essential for oxidation of fats
3. Helps in synthesis of certain essential amino acids.

Starch– It is basic. It is found in large quantity in cereals, roots & tubers.

Sugars– Comprises of three types

- monosaccharides Eg. glucose, fructose, galactose
- Disaccharides Eg. sucrose, lactose, maltose
- Polysaccharides
  - Cellulose- pectin
  - Non cellulose- inulin, plant gums, mucilage.

These again serve as the source of energy.

Cellulose– Indigestible component of carbohydrate & contributes to dietary fibres.

Eg. vegetables, fruits & grains.

Dietary fibres–1. Helps in increasing bulk of bowels and reduces the constipation.

2. Certain types of fibers help to lower cholesterol.
3. They have vital role in reducing weight.
4. It enhances satiety value.

Vitamins

Word vitamins is derived from vital-important and 'amines' having amino group in the end.

They are organic compounds, required to the body in small amounts, so catagorised under micronutrients. Also classified under protective & regulatory food. They do not yield energy, but help the body to utilize other nutrients.

Classification

fat soluble vitamines	-	Vitamine A,D,E,K
water soluble vitamins	-	Vitamine B group & vitamin C

Vitamin A

It covers both vitamin & provitamines. Vitamin-A retinol is from animal sources.

Provitamin of vitamin A is β- carotene. It is converted into retinol by intestinal mucosa.

Word retinol equivalent is used for both- RE

1 mcg of retinol = 1 mcg of RE

1 mcg of β carotene = 0.167 mcg of R.E.

Important Functions

1. Vision- It is respsonsible for the normal vision. It helps in production of retinal pigments needed for vision in dim light ie rhodopsin in rods.

2. Integrity & normal functioning of glandular epithelial tissue, which line intestinal, respiratory & urinary tracts as well as skin & eyes depend on Vitamin A.

3. It helps in the growth especially skeletal growth.

4. Immunity- Susceptibility to infection & lowered immune response is found in deficiency of vitamin A.

5. It is protective against some epithelial cancers, bronchial cancer, but results are not fully consistent.

Sources

1. Animal origin- Liver, eggs, butter, cheese, whole milk, fish & meat.

2. Plant origin- green leafy vegetables, spinach & amaranth darker the green leaves, higher the carotene, yellow fruits papaya, mango, pumpkin, roots like carrot.

3. Artificially fortified foods– milk, *vanaspathi*, margarine.

Storage

Stored in the liver in the form of retinol palmitate. The store is sufficient to meet the needs for 6-9 months.

Deficiency

Predominantly → ocular → xerophthalmia
less commonly → extraocular

1. Xerophthalmia

It includes all ocular manifestations of vitamin A deficiency from night blindness to Keratomalacia.

1. Night blindness
2. Conjunctival xerosis
3. Bitot's spots
4. Corneal xerosis
5. Keratomalacia.

Night blindness– It is beginning stage of vitamin A deficiency, with Inability to see in the dim light. Mother can detect herself that child cannot see properly in late evening or in darkness.

Conjunctival xerosis– First clinical sign of vitamin A deficiency, conjunctiva is dry & non wettable. Instead of smooth & shining, conjunctiva appears muddy & wrinkled.

Bitot's spots– Triangular pearly white or yellowish foamy spots on bulbar conjuctiva on either side of cornea, usually bilateral is known as Bitot's spots.

Corneal xerosis– Serious condition, cornea appears dull, dry, non wettable and eventually opapue. Severe deficiency leads to corneal ulceration. It may heal with scars which are opaque.

Keratomalacia– Liquifaction of cornea takes place, cornea may become soft & may burst open. The process is rapid, eye collapses & vision is lost.

Extra ocular manifestation

They consist of follicular hyperkeratosis, anorexia & growth retardation.

Treatment– Vitamin A deficiency need to be treated immediately. Initial stages of xerophthalmia are cured by administration of massive dose of 2 lakh IU of retinol palmitate.

Measures for Prevention

1. Improvement of diet, regular & sufficient intake of vitamin A rich food.

2. By preventing contributory factors. Ex PEM, respiratory infection, diarrhoea, measles.

3. Prophylactic dose of vitamins A- single massive dose of retinol palmitate orally, to all preschool children (1-6 yrs) once in 6 months is advocated, 1-6 yr- 2,00,000 IU of retinol palmitate, 6 months- 1 yrs- 1,000,00 IU of retinol palmitate.

Recommended daily allowance

Adults	600mcg.	retinol
	2400mcg	β carotene
Lactation	950 μg	Retinol
	3800 mcg	β caroteene

Toxic effects

An excess of intake of retinol causes nausia, vomiting, anaemia, sleep disorder, skin disorder, enlargement of liver and papillar edema. High intake of β carotene may colour plasma & skin.

Vitamin D (Kidney Hormone)

Nutritionally important forms are D_2 & D_3

Vitamin D_2-	Calciferol formed from irradiation of plant sterol & ergosterol.
Vitamin D_3-	Cholecalciferol animal fats & fish liver oils dehydrocholesterol/Vitamin D is largely stored in fat depots.

It is also known as **sunshine vitamin** or kidney hormone. Vitamin D is metabolically inactive. It undergoes transformation in liver & kidney. As it does not fit into classical definition of vitamins, it is known as **kidney hormone**. In presence of adequate sunlight, it is synthesized in the body by even exposure to sunlight for 5 minutes per day.

Important Functions

1. It enhances absorption of calcium & phosphorus in the intestines.

2. It stimulates mineralization of bones, enhances bone resorption & influences collagen maturation.

3. It enhances tubular reabsorption of phosphate & variable effects on calcium reabsorption.

4. It is helpful for normal growth.

Sources

1. Occurs only in animal foods like liver, egg, butter, cheese, fish liver oil.

2. Fortified foods like milk, margarine, vanaspati.

3. 7 dehydro cholesterol present in skin transformed into vitamin D in presence of sunlight.

Deficiency

- Rickets in children
- Osteomalacia in adults

Rickets

Usually found in children of age 6 months to 2 years, characterised by reduced calcification of growing bones.

Clinical features

1. Craniotabes is earliest manifestation, soft membranous bones of skull ie occipital or posterior part of parietal bones.

2. Growth failure, bone deformity especially lower limbs, pigeon chest, prominent costochondral junction (rachitic rosery).

3. Delayed teeth erruption.

4. Muscular hypotonia leading to protuberant belly, visceroptosis and lumbar lardosis.

5. Tetany & convulsions due to hypo calcaemia.

6. Bony deformity includes curved legs, Harrison's sulcus.

Osteomalacia

In adults, it is known as osteomalacia occurs in women during pregnancy & lactation as there is increased need.

Measures of Prevention

1. Health education.

2. Prophylactic doses of vitamin D in children.

3. Fortification of milk and vanaspati.

Recommended daily allowance

Adults- 2.5 mcg

Infants & children- 5 mcg

Pregnancy & lactation- 10 mcg

Vitamin E (Tocopherol)

Antisterility Vitamin

It is one of the fat soluble vitamins.

Source– Widely distributed in foods. Vegetable oil, cotton seed oil, sunflower oil, egg yolk, butter.

Plasma level- 0.8-1.4 mg/100ml.

No clear indication of dietary deficiency is found. It prevents normal growth & some times causes degeneration of renal tubular cells & muscle cells. It causes resorption of fetus after conception & degeneration of germinal epithelium in males.

Important Functions– Prevents oxidation of unsaturated fats. **RDA-** 0.8mg/g of essential fatty acid.

Vitamin K

It occurs in 2 important forms

Vitamin K_1 – Fresh green vegetables, fruits, milk

Vitamin K_2 – synthesised by bacteria in intestines

Storge– It is stored in liver.

Function– 1. It stimulates the production of co-agulation factor.

2. Helps in clotting of blood.

Deficiency– It may result due to prolonged intake of antibiotics.

In deficiency condition, prothrombin level in blood is reduced & leads to prolonged clotting time.

RDA– 0.03 mg/kg body weight/day

Vitamin B complex

Thiamine (Aneurine Vitamin B_1)– Antineuritic factor, antiberriberri factor.

Lipoic acid (Thio acetic acid)

Riboflavin (Lactoflavin, Vitamin B_2)

Nicotinic acid, Niacin, antipellegra

Pantothenic acid (Vitamin B_3), chick antidermatitis factor.

Folic acid, (pteroylglutamic acid)

Cyanacobalamin (Vitamin B_{12}), castle's extrinsic factor

Biotin (Vit H) Anti egg white injury

Choline & lipotropic factor

Paraamino benzoic acid (PABA)

Inositol

B_4

B_5

These together are known as vitamin B complex.

Thiamine

It is a water soluble vitamin required for utilization of carbohydrates.

Source– plant source– whole grain cereals, wheat, gram, yeast, pulses, oils nuts, ground nuts.

Animal source– Meat, fish, eggs are poor sources.

Thiamine is lost by milling, polishing, washing, cooking, adding baking soda.

Measures of Prevention– 1. Health education
2. Improve diet

RDA– 0.5 mg/1000 kcal of energy/day

Thiamine deficiency

Cells cannot metabolize glucose aerobically, this affect the nervous system first because, organs depend on glucose for energy. Accumulation of pyruvic acid & lactic acid, vasodilatation & increased cardiac output are the features.

Beriberi

Dry beriberi (neurological)

Wet beriberi (cardiac)

Infantile beri beri exclusively breast fed infants by mother deficient in thiamin, condition is usually fatal.

Dry beri beri (Neurological)

Chronic periferal neuropathy with wrist or foot drop, Korsakofs psychosis and wernickes encephalopathy. Acute confusional state & brain stem anamalies, ataxia, nystagmus, ophthalmoplagia (disturbance in short term memory- korsakoff's disease)

Wet beri beri (Cardiac). Generalised oedema due to biventricular heart failure with pulmonary congestion.

Cause
- malnutrition in Alcoholism
- malabsorption

Treatment– 50-100 mg thiamine slow IV immediately. 50-100 mg daily for week. Response is with in 2-3 days & immediate. Korsakoff's disease takes longer time to improve.

Riboflavin or Vitamin B_2

It is one of the water soluble vitamins responsible for cellular oxidation & co factor in number of enzymes.

Sources

Rich sources–milk, eggs, liver, kidney, green leafy vegetables.

Germination of pulses & cereals enhance riboflavin.

RDA– 0.6 mg/1000 kcal of energy

Deficiency mainly effects tongue and lips, glossitis (inflammation of tongue), Angular stomatitis, Cheilosis (dry, scaling, fissuring lips) and Nasolabial dyssabasia (seborific dermatitis).

Treatment– Riboflavin 10 mg orally results in rapid recovery.

Niacin/Nicotinic acid

It is a water soluble vitamin required for metabolism of carbodydrates, fats & proteins. It is required for normal functioning of skin, intestinal & nervous systems.

Source

Liver, kidney, meat, poultry, fish, legumes & ground nut are good sources.

RDA– 6.6mg/1000kcal of energy.

Pellagra

Dermatitis- Erythema resembling severe sunburn appears symmetrically over parts of the body exposed to sun light, particularly limbs, especially neck. Leisons may progress and form vasiculation cracking, exudation, cresting with ulceration.

Diarrhoea, anorexia, nausia, glossitis, dysphagia and-non infective inflammation, depression, demantia, delirium and irritability.

Treatment– Nicotinamide– 100 mg 8th hourly, orally or parenterally, with in 24 hours erythema & diarrhoea decrease.

Vitamin B_6 (Pyridoxine)

It is a water soluble vitamin and has prime role in metabolism of amino acids, fats & carbohydrates.

Sources

Milk, liver, meat, egg yolk, fish, whole grains, legumes & vegetables are rich sources.

RDA Adults– 2 mg/day

Pregnancy & lactation– 2.5mg/dey.

Pyridoxine Vitamin B_6– *It is found in 3 forms.*

- Pyridoxine
- Pyridoxol
- Pyridoxamine

Dietary deficiency is rare

INH, penicillamine induce vitamin B_6 deficiency.

Peripheral neuropathy and sederoblastic anemia are the deficiency diseases.

Pantothenic acid

Water soluble vitamin which has important role in biosynthesis of corticosteroids. Human blood has 18-35mg/100ml.

RDA. 10mg/day

Vitamin B_{12} (Cyanocobalamine)

It is a complex compound with cobalt atom & used as cyanocobalamine in therapy. It helps in synthesis of DNA, fatty acids & myelin factor is needed for absorption of vitamin B_{12}.

Sources– Only animal sources like liver, kidney, meat, fish, egg and milk contain vitamin B_{12}.

Deficiency of vitamin B_{12} leads to megaloblastic anemia & demyelinating disease.

RDA– adults– 1 mcg/day, lactation– 1.5 mg/day, pregnancy– 1.5 mcg/day, Infant & child– 0.2 mcg/day.

Vitamin B12- Megaloblastic anemia & neurological degeneration and integrity of myelin. In Severe cases insidious, diffuse, uneven demyelination occurs.

Peripheral neuropathy & spinal cord degeneration affecting posterior & lateral column occur. Cerebral manifestations include dementia and optic atrophy.

Treatment– Hydroxicobalamine is administered, but recovery is slow.

Folate/folacin

In food folic acid occurs in 2 forms.

- Free folates- rapidly absorbed from intestine.
- Bound folates- absorption amount is uncertain.

It helps in synthesis of nucleic acids. It is essential for normal development of blood cells.

Sources– Liver, meat, dairy products, eggs, milk, fruits & cereals.

RDA-	Adults	100 mcg
	Pregnancy	400 mcg
	Lactation	150 mcg
	Children	100 mcg

Deficiency It leads to

Three birth defects, Megaloblastic anaemia, glossitis, cheilosis & gastro intestinal problems may occur. During pregnancy it produces neural tube defect, spina bifida, anencephaly ie encephalocele, imperfect closure. To prevent defects 5 mg of folic acid is given Daily in I trimester.

Vitamin C (Ascorbic acid)

It is a water soluble vitamin, which is most sensitive for heat. Vitamin P, citrin, Rutin & Hesperidin are also permiability factors related to vitamin C.

Functions

1. Plays vital role in tissue oxidation.
2. It is eventual for collagen formation.
3. It provides supporting matrix for the blood vessels, connective tissue, bones & cartilages.
4. It facilitates absorption of iron.
5. It prevents common cold & infections.

Sources

Fresh fruits & leafy vegetable are rich sources, goose berries are rickest source of vitamin C. Germination of pulse enhances vitamin C.

RDA- 40-60 mg/day

Scurvy

Defective formation of collagen, impared healing, capillary haemorrhage, subnormal platelet adhesiveness, because platelets are rich in ascorbate.

Trauma, surgery, burns, infection, adreno corticosteroids asprins, indomethasin and tetracycline increase requirement of vitamin C.

Features

1. Swollen, spongy gums, bleed easily.
2. Perifollicular, petechial and sponteneous bleeding may occur.
3. Haemorrhage into GIT occurs.
4. Anaemia may set in.
5. Wound healing is slow.

Treatment– 250- mg of vitamin C, 8th hourly by oral route is indicated.

Biotin

It is a co-enzyme in carbohydrate, fatty acid & amino acid metabolism. Deficiency occurs rarely. Scaly dermatitis, alopacea, & paraesthesia are the symptoms.

Minerals

These are the micronutrients present in the body for proper growth, repair & vital functions of the body. They are included under protective & regulative foods. They can be classified into three types.

1. Macro Minerals- Calcium, phosphorous, sodium, potassium & magnesium.

2. Trace minerals- iron, iodine, fluorine, zinc etc.

3. Trace minerals without any specific function- lead, mercury, bromine, boron, & aluminium.

Macro minerals

Calcium

It is the most abundant mineral in the body, which is responsible for the bone & teeth formation, coagulation of blood, cardiac action & production of milk.

Calcium in the body- 1.5-2% of body weight is composed of calcium, about 1200 g of calcium is found in the body & 98% is found in the bones in the form of calcium phosphate.

Interaction of vitamin D, parathyroid hormone & calcitonin is responsible for the maintenance of equilibrium between calcium in blood & bones.

Important Functions

1. Plays vital role in formation of bones & teeth
2. Responsible for coagulation of blood.
3. Contraction of muscles is produced.
4. Cardiac action depends on serum calcium.
5. Production of milk.
6. Transmission of electrical & chemical messages.
7. Metabolism of enzymes & hormones.

Sources

Animal origin– Milk, milk-products, egg, fish. Plant origin green leafy vegetables, cereals, millets, among millets Ragi is rich in calcium.

Absorption-20-30% is absorbed. Absorption is increased by vitamin D.

Inhibition- In presence of oxalic acid with which it forms calcium oxalate, which interferes with absorption of calcium.

Deficiency- There is no specific disease produced due to deficiency of calcium.

RDA- 400-500 mg/day in adults.

Phosphorous

Human body has about 400-700 g in the form of phosphates, most of which is present in bones & teeth.

Function– Helps in formation of bones & teeth.

Sources– Present in most of foods and vegetable.

Deficiency– Rarely phosphate deficiency occurs in premature infants fed with human milk, renal tubular phosphate loss, prolonged use of aluminum hydroxide as antacids, alcoholics with carbohydrate diet. Features of hypophosphataemia are muscle weakness.

RDA. At least equal to calcium intake- 1.5 g/day.

Sodium

It is important constituent of all body fluids. In the body about 100 g of sodium is present.

Source– Occurs in many food substances, main source is common salt in the form of sodium chloride.

Mode of loss- urine & sweat.

Deficiency– (1) Occurs due to excessive sweating due to effects of heat.

(2) Loss of body fluids as in diarrhoea, cholera, bleeding etc.

Symptoms– Muscle cramps & other symptoms associated with the cause for sodium depletion.

RDA- 10-15 g/day.

Potassium

Amount– Adult human body has about 250 gm of potassium.

Source– Occurs widely in most of foods. Deficiency is rare.

RDA- It is not known accurately.

Trace Minerals

Iron

Iron is most important among the minerals. It is the most common deficiency especially in females.

Amount– Adult human body has about 3-4 g, in that 60-70% is present in blood and the remaining part in liver as storage.

Important Functions

1. It is essential in formation of hemoglobin.
2. It regulates the body temperature.
3. Muscle activity is dependent on the status of iron.
4. It helps in catacholamine metabolism.
5. It boosts up immune system.

6. It is a constituent of myoglobin, cytochromes, catalase & certain enzymes.

7. The most important point, it helps in oxygen transport & cell respiration.

Sources

Animal origin Haem iron– Liver, meat, poultry & fish. They are readily absorbed due to absence of inhibitors.

Plant origin Non haem iron– Cereals, green leafy vegetables, legumes, nuts, jaggery. Absorption is hampered by inhibitors ie phytates, oxalates, carbonates, phosphates & dietary fibers.

Factors which help in iron absorption

Ascorbic acid is the **promoter,** which helps absorption of iron. Absorption is more when there is enhanced demand.

Storage– Iron is stored in liver, spleen, bone marrow & kidney.

Modes of Iron loss.

1. Haemorrhage– Physiological Ex : menstruation, child birth.

Pathological Ex: hook worm, malaria, haemorrhoids, peptic ulcer.

2. Basal losses– urine, sweat, bile, IUCDs

Stages of iron deficiency

I stage	-	decreased iron store.
II stage	-	latent iron deficiency ie exhausted iron store
III stage	-	Iron deficiency in blood ie Anaemia

WHO cut off point of Anaemia

Anaemia	-	mild 10-11.9 gm%
Moderate	-	8-9.9 gm%
Severe	-	Below 8 gm%

Clinical features

Malaise, breathlessness, weight loss, oedema, pallor, angular stomatitis, glossitis & brittle finger nails are common features. In severe cases bald tongue & koilonychia may be present.

Diagnosis

Blood test (1) Hb % Normal value 12-14 g%. females
14-16 g%. in males

(2) serum iron concentration 0.8-1.8 mg/L normal

(3) serum ferritin value bellow 10mcg/L indicate absence of stored iron.

(4) serum transferrin saturation- it should be above 16%, normal is 30%.

Iodine

Most essential micronutrient, which is essential for synthesis of thyroxine & triodothironine.

Sources– All sea foods Ex. Fish, salt, cod-liver oil

Important Functions

Essential for normal growth & development of the body.

Goitrogens– Chemicals present in food stuffs, which interfere with iodine utilization by thyroid gland are known as goitrogen. Ex. cruciferae group of vegetables (cabbage, cauliflower).

Deficiency

Leads to set of disorders classified under Iodine deficiency Disorders (IDD). Modified from K. park.

Disorders	*Levels of severity*
Goitre	Glade I Grade II Grade III Multinodular
Hypothyroidism	Cretinism- children Myxoedema- adults Goiter-adults Clinical signs Variable
Subnormal intelligence Delayed motor mile stones Mental deficiency	Variable
hearing defects, speech defects strabismus (squint)	Unilateral or bilateral
Nystagmus spasticity	
Neuromuscular weakness	Muscle weakness in legs arms trunk spastic diplegia

Disorders	*Levels of severity*
Endemic cretinism	Hypothyroid cretinism neurological cretinism
Intrauterine death, spontaneous abortion, Dwarfism, mis carriage, mental retardation.	Myxoedematous cretinism

RDA– 150g/day

Prevention & control

1. Iodised salt - Compulsary to sale iodized salt only.
2. Iodised oil - In the form of intra muscular injection, once in 4 years, it should be administered.
3. Health education & manpower training.
4. Mass communication.

Fluorine

Most abundant mineral in nature, body fluorine 96% is found in teeth & bones in human body. It is known as two edged sword, as deficiency & excess presence both lead to problem.

Sources– Drinking water, sea foods, fish, cheese & tea are rich in fluorine.

Deficiency– *It produces dental caries.*

Excess presence– leads to fluorosis.

It is of two types, dental & skeletal fluorosis. It is endemic in places, where water contains fluorine 3-5 mg/L. in places like Andhra Pradesh, Punjab, Haryana, Karnataka, Kerala & Tamil Nadu.

Dental fluorosis– When excessive fluorine is taken during first 7 years of life, fluorosis of dental enamel occurs charactorised by mottling of enemal. When fluorine is above 1.5mg/L teeth lose their shining appearance & attain chalky white colour. Later turns to yellow, sometimes brown or black.

Skeletal fluorosis

Daily intake of 3 to 6mg/L flourine over long duration leads to skeletal fluorosis. Heavy fluoride deposition in the sketeton occurs. Concentration is more than 10 mg/L leads to crippling fluorosis & permanent disability.

Genu vulgum

It is characterised by genu vulgum & osteoporosis of lower limbs. Mostly observed in places where jowar is staple food.

Other trace minerals

Trace minerals	Function	Deficiency	Source and RDA
1. Zinc 96μg/100ml 1.4-2.3 g in body	Component of many enzymes, metabolism of glucides, proteins, synthesis of insulin, enhances immunity	Growth failure, sexual infantalism in adults, loss of taste, delayed wound healing, cause liver disease, pernicious anaemia, thalassaemia, myocardial infarction	Vegetables, meat, milk, fish RDA- 15.5 mg/day
2. Copper 100-150 mg in body		Deficiency is rare, cause may be Nephrosis, wilson's disease, PEM	Widely distributed in all food RDA- 2.2μg/day
3. Cobalt	It is part of vitamin B_{12} molecule. First stage of Hormone production ie capture of iodine by gland	Deficiency not seen	
4. Chromium less than 6 mg	Carbohydrate & insulin function		
5. Selenium		Usually associated with PEM, vitamin E deficiency & reduces antibody production.	

Measures Prevention

1. Changing the source of water
2. Treatment of water ie Nalagonda technique of defluridation
3. Avoiding fluoridated tooth pastes.

RDA

In water 0.5-0.8 mg/L is acceptable.

Importance of food containing six tastes
(षड्रसभोजनस्य महत्व)

मधुराम्ललवणतिक्तोषणकषायकाः षड्रसाः । तत्र सर्व रसं प्रवरं सात्म्य ।। (अ.हृ.१/१४)

Sweet, sour, salt, bitter, pungent & astringent are six tastes. Intake of all *rasās* is considered as superior & wholesome to the body.

सर्व रसाभ्यासो बलकराणां ।। (च.सू. २५/४०)

In take of all six *rasas* is the best among strenght enhancing factors. Even this has been mentioned in the context of order of intake of *rasās* while taking meal.

अश्नीयात् तन्मनी भूत्वा पूर्वं तु मधुरं रसं । मध्येऽम्ल लवणौ पश्चात् कटुतिक्त कषायकम् ।।
(भा.प्र.पू.५/१३२)

One should consume food in the following order, so that there is proper digestion of food. One should consume food with full concentration, begin with sweet taste, sour & salt in the middle & pungent, bitter & astringent at the end, to pacify physiologically aggravated *vāta, kapha & pitta* respectively. Here also importance has been given for consumption of all tastes.

Social effects of Nutrition

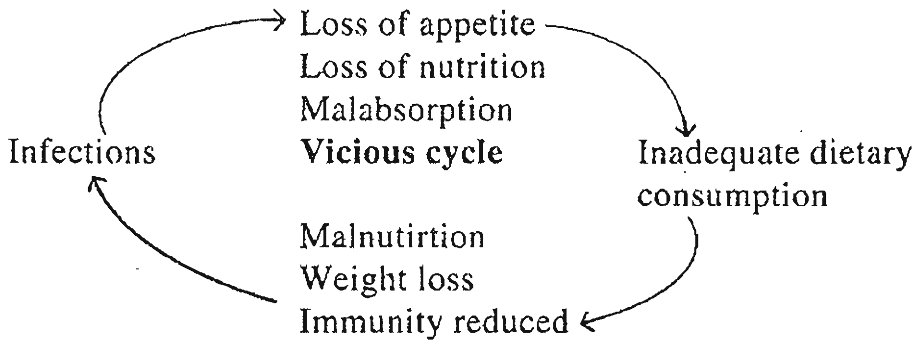
Food not only means proteins, fats, minerals, vitamins & other nutrients, but also represents culture & civilization. Hunger & malnutrition are common problems.

Malnutrition is defined as a pathological state resulting from a relative or absolute deficiency or excess of one or more essential nutrients. It is of 4 types–

1. Under nutrition–	Insufficient intake of food or total starvation.
2. Over nutrition–	Consumption of excess quantity of food.
3. Imbalance–	Disproportion among the essential nutrients.

4. Specific deficiency– Relative as complete lack of individual nutrient.

1. Conditions influencing malnutrition



2. Poverty

Most of the times, causes for malnutrition is poverty, illiteracy & ignorance. Due to poverty, the person is not able to consume nutritious diet. The place of residense is also not very well protected. Most of the times over crowded, without proper toilets, bathrooms, drinking water facility, drainage facility etc, which may lead to unhygienic surrounding & spread of many infectious diseases.

Along with poverty, as these people are not educated, they do not have the idea of family planning, healthy diet & preventive measures. Due to ignorance again the diseases are more in this community. As the size of the family is big, economic status is low, proper education is dificult to provide, so again good eomployment is not possible. Then another vicious cycle sets in.

3. Richness

The upper economic class also suffer from malnutrition, especially diseases due to over nutrition. They tend to consume more oily, fatty food, processed food, so usually suffer from over nutrition like obesity, CHD, Diabetes mellitus, Hypertension etc. Usually they are well educated, with sedantary life style & less of physical work, which is again harmful for the health.

4 Culture

Food habits, customs, beliefs, traditions & attitudes are influenced by culture. Even the psychological factors like love, affection warmth etc are also important. Religeon play important role, in nutrition, some people consume only vegetarian diet & some consume mixed diet. Cooking practices also vary, which have effect on nutrition level.

5. Social measures by health sector

1. Nutritional monitoring- conducting nutritional survey.
2. Nutritional rehabilitation through proper treatment of nutritional deficiency disorders like PEM.
3. Nutritional supplimentation.
4. Health education.

National programmes related with nutrition

1. Vitamin A prophylaxis programme– It was started in 1970. It is under ministry of Health & Family welfare Department. Survey indicates decline of blindness due to vitamin A deficiency to 0.3% by 1971-74. Later during 1986-89 further decline in incidence of blindness to 0.04%. It is one of the components of blindness control programme, implemented by, administration of massive dose of retinol palmitate orally, 2,00,000 IU (110 mg) to all preschool children, once in 6 months.

2. Prophylaxis against nutritional anaemia

It was launched during IV five year plan. MCH centres in urban area, PHCs under rural area & ICDS projects are actively involved in this programme.

Major task is distribution of iron & folic acid tablets for pregnant woman & young children (1-12 yrs). Fortification of salt with ferric orthophosphate or ferous sulphate is another technique to benefit large public.

Dosage *(a) Mothers–* one tablet of iron & folic acid containing 60mg of elemental iron (180 mg of ferous sulphate) & 0.5 mg of folic acid is given daily upto 2 to 3 months.

(b) Children– Screening test is done for suspects, one tablet of iron & folic acid, 20 mg elemental iron 60 mg ferous sulphate & 0.1 mg folic acid is given daily.

Other strategies like changing dietary habits, control of parasites & nutrition education are also adopted.

(3) Iodine deficiency disorders programme (IDD)

National Goitre control programme was started by Government of India in 1962. It was transformed in to IDD control programme in 1986. 167 million persons are exposed to risk of IDD. 71 million have goitre, cretinism & mild neurological disorders.

Reassessment of the problem was done. It showed that Goitre was not only prominent in Sub himalayan Goitre belt, but also in the states of Gujarath, punjab, Maharashtra, MP, AP & Kerala.

Essential components

1. Use of iodised salt in the place of common salt.
2. Monitoring & surviellence.
3. Training the personnel.
4. Mass communication.

Actions taken– (1) National policy to fortify all edible salts in a phased manner by the end of 8th five year plan.

(2) 26 states have banned the use of common salt.

(3) IDD control cells help in efficient working of plan.

(4) Project of intensive monitoring of IDD in five districts each, of state of UP, MP, HP & Assam. Reduce IDD prevalence in 10-14 yrs age to less than 5% & to zero new born cretins by 2000.

(5) In 1993-1995, 13 endemic states were selected for monitoring & information.

(4) Special Nutrition programme (SNP)

It was launched in 1970 as a central programme.

Beneficiaries– 1. Children below 6 years of age.

2. Pregnant & nursing mothers.

3. Dwellers of urban slums, tribal areas & backward areas.

Benefits– 1. Supplimentary food, which yields 300 kcal & 10-12gm of protien/child/day.

2. Mothers recieve 500 kcal & 25 gm of protein/day additional supply, for 300 days in a year.

In 5th five year plan, it was transferred to state Government under minimum needs programme. Gradually it was murged with ICDS programme.

(5) Balwadi Nutrition programme (BNP)

It was launched in 1970 under Department of social welfare.

Beneficiaries– Children in age group 3-6 years in rural aeas.

Funds– Indian council of child welfare & voluntary organizations recieve fund for managament, which is implemented througl

Balwadi. Child recieves 300 kcal energy & 10 gm proteins per day along with primary education.

(6) ICDS programme

Integrated child development programme was launched in 1975. It is the most important scheme in the field of child welfare. It was under Govt of India in the ministry of social & women's welfare.

Package of services

1. Supplimentary nutrition

Beneficiary– Pregnant women– 500 calories & 25 g of protein

Nursing mother– 500 calories & 25 g of protein

- Children 1-6 year age- 300 cal & 15 g protein
- Below 1 yr– 200 cal & 8-10 g protein
- 1-6 yr–300 cal & 15 g protein

2. Nutrition & Health education

It is given to all women in age group 15-45 years organized by Anganwadi workers.

3. Vaccination

- Children - OPV, BCG, DPT, Measles
- Expectant mothers - 2 doses of tetanus

4. Health check ups

- Pregnant - Antenatal checkups.
- Nursing mothers - Post natal care, contraception etc.
- Children
  - growth & development monitoring
  - immunization
  - Nutritional status evaluation
  - De-worming
  - prophylaxis against vitamin A defiency.

5. Non formal preschool education

Children between 3-6 yrs are given nonformal preschool education in Anganwadi.

Functionaries

1. Child development project officer (CDPO)

2. 4 supervisor (mukhya sevika)

3. 100 Anganwadi workers.

The supplimentary food is supplied for 300 days in a year. Along with this, health education & care for children suffering from malnutrition is given.

(7) Midday meal programme (MDMP)

It is also known as School lunch Programme. It was started in 1961.

Objective– To attract more children for school to improve literacy rate.

Principles

1. Meal should be suppliment, but not substitute for diet.

2. It comprises of minimum 1/3 rd of total energy need & 1/2 of protein need.

3. Cost should be less & easily preparable at school.

4. Locally available foods are utilized with change in menu regularly.

Under Midday meal programme 75 g. cereals, 30 g. pulses, 8g. fats, 30 g. each of leafy & non leafy vegetables are given to each child per day.

Chapter- 10
TEST OF PURITY OF FOOD

In ancient science of *Āyurveda*, we find various references of examination of food. Especially the food to be consumed by the king were examined prior to his consumption, in the view of his safety, as there was chance of poisoning.

स सम्यक्सम्पन्नमन्नं सुपरीक्षितं विशुद्धमग्न्यादिषु प्रागुपनीतं शिखिना दृष्टमभिप्रोक्षितं प्रोक्षणैः पुरःस्थितो राजनां हस्तबद्धौषधिरत्नं भोजयेत् ।। (अ.सं.सू ८/४)

The well prepared food should be first examined properly by putting in fire, shown to peacock & sprinkled with holy water. This should be served to king who is adorned with herbs precious stones in front of royal physician.

Features of poisoned foods

तत्र सविषमन्नं स्राव्यमाणमविस्राव्यं भवति, चिरेण पच्यते, पक्वं च सद्यः पर्युषितामिव निरूप्य स्तब्धं च जायते यथा स्ववर्णगन्धरसैर्व्यापद्यते प्रक्लिद्यते चन्द्रिकाचितं च भवति।(अ.सं.सू.८/६)

The food fluid in nature becomes hard, devoid of flow, takes longer duration to cook, gets spoilt very fast after cooking, natural colour, smell & taste are ultered, gets moist & shining streaks appear in the poisoned food.

व्यजनानामाशु शुष्कत्वं भवति । क्वाथः ध्मामता श्यामता हीनातिरिक्तविकृतानां चात्रच्छायानां दर्शनमदर्शनमेव वा, फेन पटलसीमन्तोर्ध्वविविधराजितन्तुबुदबुदप्रादुर्भावो, विशेषेण लवणोल्बणेषु फेनमाला, रसस्य मध्ये नीला राजिः पयसस्ताम्रा मद्यतोययोः काली, दध्नः श्यावा, तक्रस्य नीलपीता, मस्तुनः कपोताभा, धान्यम्लस्य कृष्णा, द्रवौषधस्य कपिला, घृतस्य कपिलाभा, क्षौद्रस्य हरिता, तैलस्यारुणा, वसागन्धश्च ।। (अ.सं.सू.८/७)

Condiments mixed with poison dry very fast. The fumes coming while boiling will be dark coloured, black or blue, the image of observer will be distorted and there may be absence of image. Accumulation of foam, layer, lines, threads & bubbles may be present. In the presence of excess of salt, lines of foam appear. Blue lines appear at the centre of meat soup, coppery lines in milk, black lines in alcohol & water, blue lines in curds, bluish yellow in butter milk, grey colour in *mastu* (Supernatent part of curds), black lines in sour gruel made of grains, brown lines in herbal decoction, light brown in ghee, green lines in honey, light red lines in oils & also smell of muscle fat in all above said items.

फलानामामानां पाकः, पक्वानां प्रकोथः, द्रव्याणामार्द्राणां सहसा म्लानत्वमुत्पक्वभावः शुष्काणां श्यावता वैवर्ण्यं वा कठिनानां मृदुता, मृदूनां कठिनत्वं, माल्यस्य म्लानाता, गन्धनाशः स्फुटिताग्रत्वं आस्तरणप्रावरणानां ध्याममण्डलता तन्तुरोमपक्ष्मशातनं च लोह मणिमयानां पङ्कमलोपदेहः स्नेहरागगौरवप्रभावर्णस्पर्शनाशश्च ।। (अ.सं. ८/८)

Unripe fruits ripen very fast, ripe fruits get spoilt, wet drugs lose their lusture very fast, dry drugs lose their colour & become black, hard things become soft & soft things become hard. Flowers in the garland appear lustureless, odourless & their edges crack very fast. The bed sheets & coverings will have black patches, then threads loosen & stitches released. Articles made of metals appear as if coated with wet mud, they lose their smoothness, lusture, heaviness, brightness, colour & feel.

Tests for detection of poison

1. Test by putting into fire (वन्हि परीक्षा)

वन्हिस्तु सविषमन्नं प्राप्यैकावर्तो रूक्षमन्दार्चिरिन्द्रायुध वदनेकवर्णज्वालो भृषं चटचटायते। कुणपगन्धी धूमश्चास्य मूर्छा प्रसेकरोमहर्षशिरोवेदनापीनसदृष्ट्याकुलतां जनयति। ।(अ.सं.सू.८/१०)

When poisoned food is put into fire, it burns with single point flame in interrupted & gradual way. Emits flames of different colours like rain bow and gives out crackling sounds. The fumes emitted have the smell of dead body, leads to unconsciousness, watering of eyes, horripulation, head ache, rhinitis & disturbances of vision.

2. Test by offering it to different animals (जीवि परीक्षा)

स्नेहलवणयोगादपि चाग्निरित्थं स्यात् । अतो वयोभिः परीक्षेत । तत्रविषजुष्टाहाराभ्यवहारात्काकाः क्षामस्वराः भवन्ति । मक्षिकाः विषमन्ने न निलीयन्ते । निलीनाश्च व्यापद्यन्ते। दृष्ट एव चास्मिंस्तु चकोरस्याक्षिणी विरज्येते । कोकिलस्य स्वरो विकृतिमेति । हंसस्य गतिः स्खलति। कूजति भृङ्गराजः माद्यति क्रौञ्चः। विरौति कृकवाकुः । विक्रोशाति शुकः शारिका च । छर्दयति चामीकरः । अन्यतो याति कारण्डवः । म्रीयते जीवञ्जीवको, ग्लायति वा हृष्टरोमा भवति नकुलः । शकृद्विसर्जयति वानरः । रोदति पृषतः । हृष्यति मयूरः । दर्शनादेव चास्य विषं मन्दतामुपैति।। (अ.सं.सू. ८/१२)

Similar features are produced when food mixed with ghee, oil or salt is put into fire, so foods should be tested with different animals & birds.

After consuming poisoned food the crows lose their voice, the flies donot sit on poisoned food & if by chance they sit it leads to death, the eyes of *cakora* bird become red, voice of knightingale gets altered, the gait of swan gets changed, *bhṛṅgarāja* begins to cry, *Krauñca* bird gets intoxicated. *Kṛkavāka* cries loudly, parrot & *śārika* birds make long & loud sounds, *cāmikāra* vomits, *kāraṇḍava* bird flies away, *Jīvanjīva* bird either dies or faints, *nakula*

(mangoose) gets horripulation, monkey defecates, (spotted dear) *pṛṣata* cries, peacock gets horripulation by the sight of poison & by the mere look it becomes weak.

Examination of meat (मांस परीक्षण)

Animals intended for slaughter should not be suffering from emaciation, tiredness, pregnancy, sheeppox, foot wrot, actinomycosis, brucellosis, fever, diarrhoea or any other infectious diseases.

Test of meat

Meat consists of muscle fibres held together by connective tissue. Muscle fibres are made of muscle plasma or muscle juice, 17-20% of muscle protein comprise of myosin, myoalbumin & haemoglobin. Fat is usually present along with muscles.

Inspection of meat

Animal in slaughter house should be examined before slaughtering. Mediastinal & bronchial lymphatics should be examined for tuberculosis.

Features of good meat

(1) Muscle fibres are deep red in colour embeded with fat globules (2) The reaction should be acidic.

(3) It should be firm & elastic to touch

(4) Excesse of fluid should not be present.

(5) It should have little or no odour.

(6) Fat should be whitish or yellowish grey in colour.

(7) Lymphatic glands should be free from disease.

Features of unhealthy meat

1. Soft, moist, pale, greenish coloured & putrid smelling meat.
2. Reaction is alkaline.
3. Meat juice which is not reddish.

Composition of milk & test for milk

Milk is one of the best foods. It is considered as best rejuvenator *ājasrika rasāyana,* which can be used daily.

क्षीरघृताभ्यासं रसायनानां ।। (च.सू. २५)

It is the food of newborn beings among the mammals, which is secreted after parturation. Milk is good source of proteins, fat, sugars, vitamins & minerals.

Composition of milk (All values are per 100 g of milk)

Name of milk	Moisture (g)	Protein (g)	Fat (g)	Carbohydrate (g)	Energy Kcal	Calcium mg	Phosphorus mg	Iron mg	Vit A Retinol µg	Thiamine mg	Riboflavin mg	Niacin mg	Folic acid mg	Vit C mg
Milk of buffalo	81	4.3	6.5	5	117	210	130	0.2	48	0.04	0.1	0.1	5-6	1
Milk of cow	87.5	3.2	4.1	4.4	67	120	90	0.2	52	0.05	0.19	0.1	8.5	2
Milk of goat	86.8	3.3	4.5	4.6	72	170	120	0.3	55	0.05	0.04	0.3	1.3	1
Human milk	88	1.1	3.4	7.4	65	28	11	-	41	0.21	0.02	-	-	3
Skimmed milk	92.1	2.5	0.1	4.6	29	120	90	0.2	-	-	-	-	0.1	1

Proteins– Casein is the major protein present in milk. It is present in combination with calcium as calcium caseinogenate. Other proteins lactalbumin & lactoglobulin are also present. Human milk contains greater amount of tryptophan and cystein.

Fat– It varies from 3.4% to 8.8% in buffalo's milk. It is good source of vitamin A & Vitamin D.

Sugar– lactose is present.

Minerals– Almost all minerals are found, which are needed for the body like calcium, phosphorous, sodium, potassium, magnesium, cobalt, copper and iodine.

Vitamins– All vitamins except vitamin C.

Milk Hygiene

Hygienic condition during the milking & storing of milk is very important to prevent contamination. The vessel should be sterile & kept closed. The milk handler should not have any infectious disease. Milking machines can be utilized.

Tests for detection of microorganisms

Methylene blue reduction test

Definite quantity of methylene blue is added to 10 ml of milk & sample is held at uniform temparature of 37^{0}c, untill blue colour dissappears. The milk remaining blue for the longest is the best quality milk.

Tests for pastuerized milk

1. Phosphatase test– Commonly used test. Enzyme phosphatase is always present in raw milk, which is destroyed by heating. At 60^{0}C for 30 minutes phosphatase is completely destroyed.

2. Standard plate count– Bacterial quality is found out by this test, in western countries it is 30,000 count per ml of pastuerized milk.

3. Coliform count– They are completely destroyed by pastuerization. Coliform should be absent in 1ml of milk in properly pastuerized milk.

Pastuerization of milk

According to WHO Pastuerization is defined as heating of milk to such temparatures & for such peroids of time as are required to

destroy any pathogens that may be present while causing minimal changes in the composition, flavour & nutritive value (WHO 1970).

Commonly used methods

1. Holder (Vat) method.
2. HTST (high temparature short time method).
3. UHT (Ultra High temparature) method.

1. Holder (vat) method– Milk is heated to 63-66^{0}C for atleast 30 minutes, then immediately cooled to 5^{0}C. It is ideal for rural & small community.

2. HTST (High temparature short time) Method– Milk is heated to 72^{0}C for not less than 15 seconds, then cooled immediately to 4^{0}C.

3. Flash process or UHT (Ultra Hight Temparature Method)– Milk is rapidly heated at 2 stages & second stage usually under pressure to 125^{0}C for few seconds, then rapidly cooled to 10^{0}C and immediately bottled.

Hygienically produced pasteurized milk can be stored up to 8 to 12 hours at 18^{0}C.

Chapter- 11
FOOD ARTICLES

आह्रीयते शरीरस्य पोषणार्थं अहर्निशम् । अन्नपानादि रूपेषु स आहार प्रकीर्तितः ।। (द्र.गु.वि)

That which is taken for the purpose of nourishment of the body in the form of solids or liquids is known as *āhara*. The different food articles not only help in nourishment, but also give variety & different tastes for the person who consumes it.

Food articles can be classified into two types

- *Anna dravya*
- *Drava dravya*

Annadravya	**Drava dravya**
Śūka dhānya	*Jala varga*
Śamī dhānya	*Kṣīra varga*
Kudhānya	*Dadhi varga*
Māṁsa varga	*Takra varga*
Phala varga	*Ghṛta varga*
Śāka varga	*Taila varga*
Puṣpa varga	*Madya varga*
Kanda varga	*Madhu varga*
Lavaṇa varga	*Ikṣu varga*
Kṣāra varga	
Dhātu varga	*Mūtra varga*
Ratna varga	
Kṛtānna varga	

According to Caraka Saṁhita

Śūka dhānya	*Madya varga*
Śamī dhānya	*Jala varga*
Māṁsa varga	*Gorasa varga*
Śāka varga	*Ikṣu varga*
Phala varga	*Kṛtānna varga*
Harita varga	*Āhāra yoni.*

Nutritive values

Sanskrit	Eng.	Hindi	Botanical name	Protein in (g)	CHO in (g)	Fat	Energy	Ca	P	Fe	VitA	Thia	Rib	Nia	F.A.	VitC
शालि	Paddy	चावल	Oryza sativa Linn	6.4	79	0.4	346	9	143	1	-	0.21	0.05	3.8	11	-
गोधूम	wheat	गेहूँ	Triticum aestivum Linn	11.8	71.2	1.5	346	41	306	5.3	64	0.45	0.17	5.5	36.6	-
यव	Barley	जौ	Hordium vulgare Linn	11.5	69.6	1.3	336	26	215	1.67	10	0.47	0.2	5.4	-	
कोद्रव	Kodo-millet	कोदो	Paspalum scrobicul-atum Linn	8.3	65.9	1.4	309	27	188	0.5	-	0.33	0.09	2	23	-
श्यामाक	Barnya-rd millet	साँवा	Echinochloa frumentacea Linn	6.2	65.5	2.2	307	20	280	5	-	0.33	0.1	4.2	-	-
गवेधुक	Adlay/ job's tear	गरहेडुआ	Coix lacryma jobi Linn	10.3-12.1	72.7-74.3			0.005-0.006	0.3-0.5							
कङ्गु	Italian millet	कंगुनी	Setaria italica Linn	12.3	60.9	4.3		31	290	2.8	32	0.59	0.11	3.2	15	-
चीनक	Common millet	चीना	Panicum mil-iacium Linn	7.7	67	4.7	341	17	220	9.3		0.21	0.01	4.1	-	-
जूर्ण	Great millet	ज्वार	Sorghum vul-gare Pers.	10.4	72.6	1.9	349	25	222	4.1	47	0.37	0.13	3.1	20	-

Name	Rasa	Guṇa	Vīrya	Vipāka	Doṣa Karma	Dhātu Karma
शाली	Madhura	Snigdha	Śīta	Madhura	Pitta śāmaka kaphavātakara.	Śukra vardhaka bṛṁhana Alpavarca.
गोधूम	Madhura	Guru Snigdha	Śīta	Madhura	Vāta pittaśāmaka	Sandhānakara, Jīvaniya, bṛṁhaṇa, vṛṣya, sthairyakara
यव	Madhura kaṣāya	Rūkṣa Īṣatguru	Śīta		Kaphahara, vātakara	Purīṣajanana, balya, sthairyakara
कोद्रव	Kaṣāya Madhura	Laghu rūkṣa	Śīta	Kaṭu	Kaphapittahara, vāta kara.	Śoṣaṇa, grāhī
श्यामाक	Kaṣāya Madhura	Laghu rūkṣa	Śīta	Kaṭu	Kapha pittahara, vātakara	Śoṣaṇa
गवेधुक	Kaṣāya Madhura	Laghu rūkṣa	Śīta	Kaṭu	Kaphahara	Kārśyajanaka
कङ्गु	Kaṣāya Madhura	Guru rūkṣa	Śīta	Kaṭu	Kaphahara vātakara	Bṛṁhaṇa bhagnasandhānakara.
चीनाक	Kaṣāya Madhura	Guru rūkṣa	Śīta	Kaṭu	Kaphahara	Bṛṁhaṇa, bhagnasandhānakara
जूर्ण	Kaṣāya Madhura	Laghu rūkṣa	Śīta	Kaṭu	Kaphapittahara	Śukranāśana, kledahara

Sanskrit	Eng.	Hindi	Botanical name	Protein in gm	CHO in gm	Fat in gm	Energy	Ca in mg	P in mg	Fe in mg	VitA µg	Thia	Rib	Nia	F.A.	VitC
मधूलिक	Finger millet	मडुआ मंडल	Eleusine coracana gaertn	7.3	72	1.3	328	344	283	3.9	42	0.42	0.19	1.1	18.3	-
वज्रान्न	Pearl millet	बाजरा	Pennisetum typhoides Burmf	11.6	67.5	5	361	42	296	8	132	0.33	0.25	2.3	45.5	-
महाकाय	Maize	मक्का	Zea mays Linn	11.1	66.2	3.6	342	10	348	2.3	90	0.42	0.1	1.8	20	-
कुसुम्भ			Carthamus Tinctorius Linn	13.5	17.9	25.6	356	236	823	4.6						
नीवार	Wild rice	तेनी	Hygrorhyza aristata Nees													

Name	*Rasa*	*Guṇa*	*Vīrya*	*Vipāka*	*Doṣa karma*	*Dhātu karma*
मधूलिक	Kaṣāya Tikta Madhura	Laghu	Śīta	Kaṭu	Tridoṣa hara, pittahara	
वज्रान्न	Madhura	Rūkṣa	Uṣṇa	Madhura	Kaphavāta hara	Balya, Puṁstvahara Durjara.
महाकाय	Madhura	Rūkṣa			Kapha pitta hara, vāta kara	Viṣṭambhi puṣṭikara
नीवार	Kaṣāya Madhura	Rūkṣa	Śīta	Kaṭu	Kaphapitta hara, vāta kara	Śoṣaṇa

(शम्बिधान्य/शमिधान्य) Nutritive value

Sans-krit	English	Hindi	Botanical name	Protein	Fat	CHO	Ene-rgy	Ca	P	Fe	VitA	Thia	Rib	Nia	F.A.	VitC
मुद्र	Green gram	मूँग	Vigna radiata Linn	24	1.3	56.7	334	124	326	4.4	94	0.47	0.27	2.1	-	-
–	dal	मूँग का दाल	Vigna radiata Linn	24.5	1.2	59.9	348	75	405	3.9	49	0.47	0.21	2.4	140	-
माष	Black gram	उड़द	Vigna mungo Linn	24	1.4	59.6	347	154	385	3.8	3.8	0.42	0.2	2	132	-
आढकी	Red gram	अरहर	Cajanus cajan Linn	22.3	1.7	57.6	335	73	304	2.7	132	0.45	0.19	2.9	103	-
मसूर	Lentil	मसूर	Lens culinaris Medic	25.1	0.7	59	343	69	293	7.58	270	0.45	0.2	2.6	36	-
चणक	Bengal gram	चना	Cicer arietin-um Linn	17.1	5.3	60.9	360	202	312	4.6	189	0.3	0.15	2.9	186	3
	Dal		Cicer arietin-num Linn	20.8	5.6	59.8	372	56	331	5.3	129	0.48	0.18	2.4	147.5	1
	Roasted dal		Cicer arieti-num Linn	22.5	5.2	58.1	369	58	340	9.5	113	0.2		1.3	139	-
सतीन/ कलाय	Pea	मटर	Psisum sati-vum Linn	19.7	1.1	56.5	315	75	298	7.5	39	0.97	0.19	3.4	7.5	-
त्रिपुटक	Gram pea	खेसारी	Lathyrus sat-ivus Linn	28.2	0.6	56.6	345	90	317	6.3	120	0.39	0.17	2.9	-	-

Name	Rasa	Guṇa	Vīrya	Vipāka	Doṣa Karma	Dhātu Karma
मुद्ग	*Madhura*	*Laghu, rūkṣa, viśada*	*Śīta*	*Kaṭu*	*Kapha pitta hara*	*Cakṣuṣya, Grāhī, Jvaraghna*
माष	*Madhura*	*Guru, snigdha*	*Uṣṇa*	*Madhura*	*Vāta hara, kapha pitta kara*	*Vṛṣya, balya, stanya janana, purīṣa janana, klaibya hara.*
आढकी	*Kaṣāya*	*Laghu*	*Śīta*		*Vāta kara, kapha pitta hara.*	*Grāhī, varṇya*
मसूर	*Madhura*	*Laghu, rūkṣa*	*Śīta*	*Madhura*	*Vātala, kaphapitta hara*	*Rakta pittahara, Jvaraghna, grāhī*
चणक	*Kaṣāya*	*Laghu, rūkṣa*	*Śīta*		*Kapha pitta hara vātala.*	*Puṁstva hara*
सतीन	*Madhura*	*Rūkṣa*	*Śīta*		*Vātala*	*Rakta pitta hara.*
त्रिपुट	*Madhura*	*Rūkṣa*	*Śīta*		*Vātala*	*Paṅgu*

Sanskrit	English	Hindi	Botanical name	Protein	Fat	CHO	Energy	Ca	P	Fe	VitA	Thia	Rib	Nia	F.A.	VitC
मकुष्ठक	moth been Aconite bean	मोठ	Vigna aconitifolia (Jacq-marechal)	23.6	1.1	56.5	330	202	230	9.5	9	0.45	0.09	1.5	-	2
कुलत्थ	Horse gram	कुल्थी	Dolicus biflorus	22	0.5	57.2	321	287	311	6.77	71	0.42	0.2	1.5	-	1
राजमाष	Cow pea	लोबिया बोडा	Vigna unguiculata Linn	24.1	1	54.5	323	77	414	8.6	12	0.51	0.2	1.3	133	-
निष्पाव	Indian butter bean	सेम	Dolicus lab lab Linn	24.9	0.8	60.1	347	60	433	2.7		0.52	0.16	1.8	-	-
शिम्बि	Double Bean	सेम	Phaseolus Lunatus Linn	19.7	1.6	57.8										
राज-शिम्बि	Soya bean	भटवार तोरी	Glycine max Merill	43.2	49.5	20.9	432	240	690	10.4	426	0.73	0.39	3.2	100	-
तुवरी	Rocket salad Rajmah		Euca sutira mill Phaseolus Vulgaris	22.9	1.3	60.6	346	260	410	05.1						

* all belong to Leguminosae family

Name	Rasa	Guṇa	Vīrya	Vipāka	Doṣa Karma	Dhātu Karma
मकुष्ठक	*Madhura*	*Rūkṣa*	*Śīta*	*Madhura*	*Kapha pittahara, vātala*	*Grāhī, Rakta pitta jvarahara*
कुलत्थ	*Kaṣāya*		*Uṣṇa*	*Amla*	*Kaphavāta hara, pitta kara*	*Grāhī, Aśmarighna, Śukraghna Netraroga hara*
राजमाष	*Kaṣāya Madhura*	*Guru, rūkṣa, viśada, sara*	*Śīta*	*Madhura*	*Kapha pitta hara, vātala*	*Śukraghna, balya, stanya janana Amla pitta hara.*
निष्पाव	*Kaṣāya Madhura*	*Guru, rūkṣa sara*	*Uṣṇa*	*Amla*	*Kaphahara, vāta pitta kara*	*Vidāhī, Śukraghna, vibandhakara*
शिम्बी	*Kaṣāya*	*Rūkṣa, guru*		*Kaṭu*	*Vātala*	*Avṛṣya, balahara.*
राजशिम्बी	*Madhura Kaṣāya*	*Guru, snigdha*	*Uṣṇa*	*Madhura*	*Vātahara*	*Stanya janana balya*
तुवरी			*Laghu Tīkṣṇa*	*Uṣṇa*	*Kaphahara*	*Dīpana, grāhī, krimighna, kuṣṭhaghna*

(शाकवर्ग)

Sanskrit	English	Hindi	Botanical name	Protein	Fat	CHO	Energy	Ca	P	Fe	VitA	Thia	Rib	Nia	F.A.	VitC
उपोदिक	Indian spinach	पोई	Basella rubra (chenapodiaceae) F.	2.8	0.4	4.2	32	200	35	10	7440	0.03	0.16	0.5	-	87
मारिष	Amaranth	मरसा	Amaranthus blitumour (Amaranthaceae) F	2.9						18.17						
तण्डुलीय	Amaranth	चौलाई	Amaranthus spinosus (Amaranthaceae) F	4	0.5	6.1	45	397	83	3.5	5520	.03	0.3	1.2	149	99
पालङ्क्या	Spinach	पालक्	Spinacea oleracie Linn (chenapodiacae) F	2	0.7	2.9	26	73	21	1.1	5580	0.03	0.26	0.5	123	28
पत्रगोभी	Cabbage	पत्ता गोभी	Brassica olerucir Linn (cruciferae) F	1.8	0.1	4.6	27	39	44	0.8	120	0.06	0.09	0.4	23	124
मूलकपत्र	Radish leaves	मूली	Raphanus sativus	3.8	0.4	2.4	28	265	59	0.09	5295	0.18	0.47	0.8	-	81

Name	Rasa	Guṇa	Vīrya	Vipāka	Doṣa Karma	Dhātu Karma
उपोदिक	Madhura	Guru, Snigdha, Picchila	Śīta	Madhura	Kaphakara, vāta pitta hara	Anulomana, balya, vṛṣya, madahara, nidrāhara
मारीष	Madhura	Guru rūkṣa	Śīta	Madhura	Pitta hara, vāta kapha kara	Viṣṭaṁbhī, rakta pitta hara
तण्डुलीय	Madhura	Laghu, rūkṣa			Kapha pitta hara	Raktapitta hara, Madaghna Viṣaghna, mūtrala
पालाङ्क्या	Madhura	Rūkṣa	Śīta	Madhura	Pitta hara	Viṣṭaṁbhī, Rakta pitta
पत्रगोभी	Madhura	Guru		Madhura		Durjara, rucya
मूलकपत्र	Kaṭu	Laghu	Uṣṇa	Kaṭu	Tridoṣa hara	

Sanskrit	English	Hindi	Botanical name	Protein	Fat	CHO	Energy	Ca	P	Fe	VitA	Thia	Rib	Nia	F.A.	VitC
पूतिहा	Mint	पुदीना	Mentha spicata	4.8	0.6	5.8	48	200	62	15.6	1620	0.05	0.26	1	114	27
सर्षप	Mustard	सरसों	Brassica compestris	4	0.6	3.2	34	155	26	16.3	2622	0.03	-	-	-	33
शिग्रु	Drumstick	सहजिन	Moringa oliefra (Moringaceae) F	6.7	1.7	12.5	92	440	70	0.85	6780	0.06	0.05	0.8	-	220
मेथिक	Fenugreek	मेथी	Trigonella foenum greekum	4.4	0.9	6	49	395	51	1.93	2340	0.04	0.31	0.8	-	52
	Curry leaves	करी पत्ता	Murraya koengii	6.1	1	18.7	108	830	57	0.9	7560	0.08	0.21	2.3	93.9	4
आलूकी	Colocasia leaves	अरवी	Colocasia Antiquorum	6.8	2	8.1	77	460	125	0.98	12000	0.06	0.45	1.9	-	63

Name	Rasa	Guṇa	Vīrya	Vipāka	Doṣa Karma	Dhātu Karma
पूतिहा	*Kaṭu*	*Laghu*	*Uṣṇa*	*Kaṭu*	*Vāta, kapha hara*	*Rucya, Ādhmāna, sūla hara, vamanahara, krimihara*
सर्षप	*Kaṭu lavaṇa*	*Guru, rūkṣa, Tīkṣṇa*	*Uṣṇa*	*Amla*	*Tridoṣa kopaka*	*Vidāhī*
शिग्रु	*Kaṭu*	*Tīkṣṇa*	*Uṣṇa*	*Kaṭu*	*Kaphapitta hara*	*Krimighna, Śothahara*
मेथिका	*Kaṭu*	*Laghu, Snigdha*	*Uṣṇa*	*Kaṭu*	*Vāta Śāmaka*	*Dīpana, Pācana, Anulomana*
आलूकी	*Kaṣāya Madhura*	*Guru, snigdha, picchila*	*Uṣṇa*	*Kaṭu*	*Kapha pitta kara*	*Viṣṭambhī, balya*

(फलशाक)

Sanskrit	English	Hindi	Botanical name	Protein	Fat	CHO	Energy	Ca	P	Fe	VitA	Thia	Rib	Nia	F.A.	VitC
कूष्माण्ड	Ashgourd	पेठा	Benincasa hispida	0.4	0.1	1.9	10	30	20	0.8	-	0.06	0.01	0.4	-	1
अलाबू	Bottle gourd	लौकी	Lageneria siceracia	0.2	0.1	2.5	12	20	10	0.46	-	0.03	0.01	0.2	-	-
कारवेल्लक	Bitter gourd	करेला	Momerdica chirantia linn	1.6	0.2	4.2	25	20	70	0.6	126	0.07	0.09	0.5	-	88
पटोल	Snake gourd	परोरी	Trichosanthes dioica Roxb	0.5	0.3	3.3	118	26	20	1.51	96	0.04	0.06	0.3	15.5	-
शिग्रु	Drum-stick	सहजिन	Moringa olefra	2.5	0.1	3.7	26	30	110	0.18	110	0.05	0.07	0.2	-	120
शिग्रुपुष्प	Flowers	सहजिन	Moringa oleifra	3.6	0.8	7.1	50	51	90							
वृन्ताक	Brinjal	बैंगन	Solanum me-longena Linn	1.4	0.3	4	24	18	47	0.4	74	0.04	0.11	0.9	34	12
बिम्बि	Kovai	कुंदरु	Coccinia indica	1.2	0.1	3.1	18	40	30	0.38	156	0.07	0.08	0.7	59	15
कदली	Plantain green	केला	Musa indica	1.4	0.2	14	64	10	29	6.3	30	0.05	0.02	0.3	16.4	24
कदली पुष्प	(flowers)	केला	Musa indica	1.7	0.7	5.1	34	32	42	1.6	27	0.05	0.02	0.4	.4	16

Name	***Rasa***	***Guṇa***	***Vīrya***	***Vipāka***	***Doṣa Karma***	***Dhātu Karma***
कूष्माण्ड	*Kaṭu*	*Tīkṣṇa*	*Uṣṇa*	*Kaṭu*	*Kaphahara Pittakara*	*Rucya, Śūlahara*
अलाबू		*Guru, Rūkṣa*	*Śīta*		*Kaphapitta hara*	*Balya, vṛṣya, bṛṁhaṇa, hṛdya*
कारवेल्लक	*Tikta*	*Laghu*	*Uṣṇa*	*Kaṭu*	*Kapha pitta hara*	*Dīpana, bhedana, Jvara, Prameha, Krimi, pitta vyādhi*
पटोल		*Laghu, snigdha*	*Uṣṇa*		*Tridoṣahara*	*Dīpana, Pācana, hṛdya, Vṛṣya.*
शिग्रु	*Kaṭu*	*Tīkṣṇa*	*Uṣṇa*	*Kaṭu*	*Kaphahara Pittakara*	*Rucya, Śūlahara*
वृन्ताक	*Madhura*	*Laghu*	*Uṣṇa*	*Madhura*	*Kapha pitta kara*	*Dīpana, Medohara.*
बिम्बी	*Madhura*	*Guru*	*Śīta*	*Madhura*	*Vāta pitta hara*	*Stambha, lekhana, rucya, vibandha kara*
कदली	*Kaṣāya*	*Guru*	*Śīta*	*Kaṭu*	*Śīta*	*Stambhakara, Rakta pitta hara*

(फलशाक)

Sanskrit	English	Hindi	Botanical name	Protein	Fat	CHO	Energy	Ca	P	Fe	VitA	Thia	Rib	Nia	F.A.	VitC
रक्तवृ-न्ताक	Tomato	टमाटर	Lycoprilion esculentum	1.9	0.2	3.6	20	48	20	0.6	351	0.12	0.06	0.4	30	27
सूरण	corm	जमी कन्द	Amorphop-hellus comp-anulatus	1.2	0.1	18.4	79	50	34	0.6	260	0.06	0.07	0.7	-	-
आलूक	Potato	आलू	solanum tube-rosum	1.6	0.1	22.6	97	10	40	0.5	24	0.1	0.01	1.2	7	17
कृत-वेधन	Ridge-gourd	तरोई	Luffa Acut-angula	0.5	0.1	3.4	17	18	26	0.4	33	-	0.1	0.2	-	5

Name	*Rasa*	*Guṇa*	*Vīrya*	*Vipāka*	*Doṣa Karma*	*Dhātu Karma*
रक्तवृन्ताक	*Madhura, Amla*	*Laghu*	*Uṣṇa*	*Madhura*	*Kapha pitta hara*	*Jīvanīya, balya*
सूरण	*Kaṭu, Kaṣāya*	*Viśada, laghu*	*Uṣṇa*	*Kaṭu*	*Kaphaghna*	*Dīpana, Rucya,Arśoghna*
आलूक	*Madhura*	*Guru*	*Uṣṇa*	*Madhura*	*Rakta pitta vardhaka*	*Balya, bṛṁhaṇa*

(फलवर्ग)

Sanskrit	English	Hindi	Botanical name	Protein	Fat	CHO	Energy	Ca	P	Fe	VitA	Thia	Rib	Nia	F.A.	VitC
आम्र	Mango	आम	Mangifera indica Linn	0.6	0.4	16.9	74	19	16	1.3	2743	0.08	0.09	0.9	-	16
मृद्वीक	Grapes	अंगूर	Vitis vinifera Linn	0.5	0.3	16.5	71	20	30	0.5	-	-	-	-	-	1
दाडिम	Pomegranate	अनार	Punica granatum Linn	1.6	0.1	14.5	65	10	70	1.8	-	0.06	0.1	0.3	-	16
खर्जूर	Dates	खजूर	Phoenix sylvistris Roxb	1.2	0.4	33.8	144	22	38	0.96	-	-	-	-	-	
	Dry		Phoenix sylvistris Linn	2.5	0.4	75.8	317	120	50	7.3	26	0.01	0.02	0.9	-	3
कदली	Banana	केला	Musapara disiaca Linn	1.2	0.3	27.2	116	17	36	0.4	78	0.05	0.08	0.5	-	7
बदर	Jujube	बेर	Zizipus jujube Lam	0.8	0.3	17	0.3	4	9	1.8	0.021	0.02	0.02	0.7	-	76
परूषक	Falsa	फालसा	Grevia asiatica Linn	1.3	0.9	147	72	129	39	3.1	419	-	-	0.3	-	22
बिल्व	Bael	बेल	Aegle marmelos Lorr.	1.8	0.3	31.8	137	85	50	0.6	55	0.13	0.03	1.1	-	8
पनस	Jack	कटहल	Artocarpus integra	1.9	0.1	19.8	88	20	41	0.56	175	0.03	0.13	0.4	-	7
आमलकी	Amla	आवला	Emblica officinalis Gaertn	0.5	0.1	13.7	58	50	20	1.2	9	0.03	0.01	0.2	-	600

Name	Rasa	Guṇa	Vīrya	Vipāka	Doṣa Karma	Dhātu Karma
आम्र	Madhura			Madhura	Vātahara	Śukrala, balya, māṁsavardhaka
मृद्वीका	Madhura	Snigdha	Śīta	Madhura	Vātapittahara	Bṛṁhana, vṛṣya, jvara hara, kāsahara, anulomana
दाडिम	Madhura				Tridoṣaghna	Hṛdya, dīpana, grāhī
खर्जूर	Madhura	Snigdha	Śīta	Madhura	Vāta pitta hara	Bṛṁhana, vṛṣya
कदली	Madhura Kaṣāya	Guru	Śīta	Madhura	Kaphakara	Viṣṭaṁbhī, balya, vṛṣya, rakta pitta hara.
बदर	Madhura	Snigdha		Vāta pitta hara		Tṛṣṇāhara, śramahara, balya, vṛṣya
परूषक	Madhura Amla	Snigdha	Madhura	Vāta hara pitta hara		Rucya, Tṛṣṇāhara, hṛdya, mūtra doṣahara
बिल्व	Kaṣāya	Guru	Uṣṇa	Kaṭu	Kapha vāta hara	Staṁbhaka
पनस	Madhura	Guru			Vātala	Vṛṣya, balya, vibandhakara

Sanskrit	English	Hindi	Botanical name	Protein	Fat	CHO	Energy	Ca	P	Fe	VitA	Thia	Rib	Nia	F.A.	VitC
लकुच	Lakuch	बडहल	Artocarpus lakoocha Roxb	0.7	1.2	13.3	66	50	20	0.5	254	0.02	0.15	0.3	-	135
ऊरूमाण	Apricot	जर्दालू	Prunus armeniaca Linn	1	0.3	11.6	53	20	25	2.2	2160	0.04	0.13	0.6	-	6
सेव	Apple	सेव	Malus pumila mill (rosaceae)	0.2	0.5	13.4	59	10	14	0.7	-	-	-	-	-	1
टंक	Pear	नासपाती	Pyris communis Linn (Rosaceae)	0.6	0.2	11.9	52	8	15	0.5	28	0.06	0.03	0.2	-	-
खर्बूज	Musk-melon	खर्बूज	Cucumis melo Linn (cucurbitaceae)	0.3	0.2	3.5	17	32	14	1.4	169	0.11	0.08	0.3	-	26
कालिन्द	water melon	तरबूज	Citrulus vulgaris schead (cucurbitaceae)	0.2	0.2	3.3	16	11	12	7.9	-	0.02	0.04	0.1	-	1
अनानस	Pineapple	अनानस	Ananas commosus Linn	0.4	0.1	10.8	46	20	9	2.4	18	0.2	0.12	0.1	-	39
एरण्ड कर्कटी	Papaya	पपीता	Carica papaya Linn	0.6	0.1	7.2	32	17	13	0.5	666	.04	0.25	0.2	-	57

Name	Rasa	Guṇa	Vīrya	Vipāka	Doṣa Karma	Dhātu Karma
लकुच	Kaṣāya Amla	Guru	Uṣṇa		Tridoṣakopaka	Rakta kopa, Agnimāndya Śukraghna, Dṛṣṭi hara
उरुमाण	Madhura	Snigdha, Guru	Uṣṇa	Madhura	Vātahara, kapha pittahara	Balya, bṛṁhaṇa
सेव	Madhura Kaṣāya		Śīta		Vāta pitta hara kapha kara	Bṛṁhaṇa, grāhī
टंक	Madhura Kaṣāya	Guru	Śīta	Madhura	Vātala	Balya
खर्बूज	Madhura	Guru, snigdha	Śīta	Madhura	Vāta pitta hara	Mūtrala,balya,vṛṣya, sāraka
कालिन्द	Madhura	Guru	Uṣṇa		Pitta kara	Grāhī, avṛṣya
अनानस	Madhura	Guru		Madhura	Vātahara, Kapha kara	Balya, Krimighna
एरण्डकर्कटी	Madhura	Laghu	Śīta	Pitta hara		

Sans-krit	English	Hindi	Botanical name	Protein	Fat	CHO	Ene-rgy	Ca	P	Fe	VitA	Thia	Rib	Nia	F.A.	VitC
अमरूद	Guava	अमरुद	Psidium guajava Linn (Myrtaceae)	0.9	0.3	11.2	51	10	28	0.3		0.03	0.03	0.4	-	212
सीताफल	Custard apple	शरीफा	Annona squamosa Linn (annonaceae)	1.6	0.4	23.5	104	17	47	4.31	-	0.07	0.17	1.3	37	
लीची	Lichi	लीची	Litchi chinensis (Gaertn)	1	0.3	13.6	61	10	35	0.7	-	0.02	0.6	0.4	-	31
नारङ्ग	Orange	सन्तरा	Citrus reticulata Blanco (Rutaceae)	0.7	0.2	10.9	48	26	20	0.32	-	1104	-	-	-	30
मिष्ट-निम्बुक	sweet lime	मीठा निम्बू	Citrus lemottoidus Tanaka (Rutaceae)	0.7	0.3	0.3	35	30	20	0.7	-	-	0.04	-	-	45

Name	*Rasa*	*Guṇa*	*Vīrya*	*Vipāka*	*Doṣa Karma*	*Ahya Karma*
अमरूद	*Madhura, kaṣāya*		*Śīta*		*Pittahara, vāta kapha kara*	*Mūtrala, Āma śodhana*
सीताफल	*Madhura*		*Śīta*		*Vāta kara, pitta hara*	*Balya, bṛṁhana, vṛṣya, hṛdya*
लीची	*Madhura*	*Sara guṇa*	*Uṣṇa*	*Mudhura*	*Vāta hara, kapha pitta hara*	*Rucya, Viṣṭaṁbhī*
नारङ्ग	*Madhura*	*Viśada*			*Vātahara*	*Hṛdya, rucya*
मिष्टनिम्बूक	*Madhura*	*Guru*			*Vāta pitta hara*	*Balya, bṛṁhaṇa, rucya*

Source– Nutritive value of Indian foods by C. Gopalan, B.V. Sastri, S.C. Bala subramanian, revised & updated by B.S. Narasinga Rao, Y.G. Deosthale & K.C. Pant, NIN 1989.

Varieties of sugar cane (इक्षु वर्ग)

Jaggery (*Guḍa*), black semisolid product of sugar cane (*phāṇita*), crude sugar after expression of juice in the shape of egg (*Matsyaṇḍika*), sugar candy (*Khaṇḍa*) & sugar (śarkarā) are included under different varieties of sugar cane.

वृष्यःशीतः सरः स्निग्धो बृंहणो मधुरो रसः । श्लेष्मलो भक्षितस्येक्षोर्यान्तिकस्तु विदह्यते ।।
शैत्यात् प्रसादान्माधुर्यात् पौण्ड्रकाद्वंशकोज्वरः (च.सू. २७/२३७)

Sugar cane juice is aphrodiasac, cold, laxative, unctous, nourishing, sweet in taste and aggravates kapha. The juice extracted from machine causes indigestion (*vidāha*). *Paundraka* variety is superior.

Varieties of Alcohol

Sura, Madirā, Jagala, Ariṣṭa, Śārkara, Pakvarasa, Śītarasika, Gauḍa, Ākṣikī, Surāsava, Madhvāsava, Maireya, Āsava, Madhūlika, Sauvīraka & Tuṣodaka are different types of *madya.*

प्रकृत्या मद्यमम्लोष्णमम्लं चोक्तं विपाकतः । सर्वं सामान्यस्तस्य विशेष उपदेक्ष्यते ।।
(च.सू.२७/१७८)

Alcoholic preparations by nature have sour taste as well as *vipāka* & hot in potency.

Varieties of Honey

Mākṣika, bhrāmara, kṣaudra & pauttika are varieties of honey.

वातलं गुरु शीतं च रक्तपित्तकफापहम् । सान्धातृच्छेदनं रूक्षं कषायं मधुरं मधु ।।
(च.सू.२७/२५४)

Honey aggravates *vāta*, cures diseases of blood, *pitta & kapha.* It has heavy, cold, healing, scraping, dry, astringent & sweet qualities.

Varieties of Oil

Sessame oil (*Tila taila*), castor oil (*eraṇḍa taila*), mustard oil (*Sarṣapa taila*), Linseed oil (*Kusuṃbha taila*), Neem oil (*Nimbataila*) etc, are considered under different oils.

तैलं स्वयोनिवत्तत्र मुख्यं तीक्ष्णं व्यवायी च । त्वग्दोषकृदचक्षुष्यं सूक्ष्मोष्णं कफकृन्न च ।।
कृशानां बृंहणायालं स्थूलानां कर्शनाय च । बद्धविट्कं कृमिघ्नं च संस्कारात् सर्वरोगजित् ।।
तैलप्रयोगादजरा निर्विकारा जितश्रमाः । आसन्नातिबला युद्धे दैत्याधिपतयः पुरा ।।
(अ.हृ.६/९९-१०१)

Oils mainly have sharp, spreading (*vyavāyī*), minute (*sūkṣma*) & hot in potency. They vitiate blood, not good for eyes & do not aggravate *kapha*. Conducive for emaciated as well as fat, cause

constipation, destroy worm, (*kṛmi*) & conquer all diseases. Usage of oil prevents old age, tiredness & enhances strength.

Kṛtānna varga (cooked food preparations)

1. Gruel (*Peya*) 2. Thick gruel (*vilepī*)

3. Gruel water (*Maṇḍa*)

4. Juices & soups *Yūṣa* — *Kṛta* / *Akṛta*

5. *Saktu* roasted corn flour

Thin gruel (*peyā*) alleviates hanger, thirst, weakness, abdominal disease & fever. It enhances sweating and is digestive, conducive to movement of flatus.

Varieties of meat (Māṁsa varga)

Classifications

1. *Prasaha*– (Animals & birds which eat by snatching) Animals like cow, donkey, mules, camel, panther, bear, wolf, hyena, cat, rat, tiger, rabbit etc are included in this catagory.

2. *Bhūmiśaya*– (Animals living in burrows) python, hedge hog, frog, pangolin, inguana etc are included.

3. *Ānūpa*– (Animals in marshy land) wild boar, rhinocerus, yak, buffalos, elephant, hog, deer etc.

4. *Vāriśaya* (Aquatic animals) tortoise, fish, whale, snail, crocodile, crab, pearl oyster, ealfish etc .

5. *Vāricara* (Birds moving in water) swan crane, common crane etc.

6. *Jāṅgala* (Animals dwelling in dry land, forests) spotted deer, hog deer, wild sheep, mule, deer, black buck etc.

7. *Viṣkira* (gallinacious birds)

Common quails, gray partridge, peacock etc.

8. *Pratuda* (Pecker birds) wood pecker, dove, pigeon, sparrow, parrot, etc are included in this.

According to Aṣṭāṅga Saṅgraha

1. *Mṛga*
2. *Viṣkira*
3. *Pratuda*

} *Jāṅgala*

4. *Mahāmṛga*
5. *Jalacara* } *Ānūpa*
6. *Matsya*
7. *Bileśaya* } *Sādhāraṇa*
8. *Prasaha*

Properties of meat of terrestrial animals (Jāṅgala māṁsa)

तत्र बद्धमला रुच्य मांसानामुत्तमाः हिमाः । कषायस्वादु विशदा लघवो जाङ्गाला हिताः ।। पित्तोत्तरे वातमध्ये सन्निपाते कफानुगे ।। (अ.सं.सू. ७/८४-८५)

Meat of *Jāṅgala* animals cause constipation, improve taste, best among meats, cold, astringent, sweet, nonunctous, easily digestable, light and conducive. They alleviate *sannipāta* where *pitta* is aggravated to high degree, *vāta* to moderate extent and *kapha* to less extent.

गुरूष्ण स्निग्धमधुरा वर्गाश्चातो यथोत्तरम् । मूत्रशुक्रकृतो बल्या वातघ्नाः कफपित्तलाः ।।
(अ.हृ.७/९५)

Flesh of Bileśayādi animals are heavy, hot, unctous & sweet in properties. They are *mūtrala, śukrala, balya, vāta hara & kapha pitta hara.*

Vegetarian Food

Advantage

1. Cheaper sources of food.

2. Enhance *satva guṇa* in a person.

3. Easy for digestion, plant sources of fat are better than animal sources, as they are rich in essential fatty acids.

5. Polyunsaturated fatty acids are found in vegetable oils, which are beneficial for the body.

6. Essential fatty acids increase HDL, thus help to reduce cholesterol & thus protect the body against CHD.

7. Ascorbic acid is mainly found in plant sources. Even though fresh meat & fish contain it in minute quantities, it is destroyed on standing. Thus helps in prevention of scurvey.

8. Dietary fibre is provided by only vegetarian diet, which helps in weight reduction. It is beneficial in gall stones, diabetes, coronary heart disease, hypertension, bowel disease including cancer.

Disadvantages

1. From nutritional view plant proteins are inferior to animal proteins, as they are 'biologically incomplete'. But combination of pulses & cereals may complement each other & act as beneficial.

2. Plant source of vitamin A is in the form of Beta carotene, some of it is converted into retinol, which is later assimilated, so amount of consumption should be more compared to animal source.

3. Vitamin D occurs only in animal origin food, even then pure vegetarian does not usually suffer from vitamin D deficiency, as it can be synthesised in the body in presence of sunlight.

4. Plant sources of Calcium can not be absorbed completely due to the presence of inhibitors like oxalic acid.

5. Plant sources of iron are known as nonhaem iron & their bioavailability is poor, due to presence of phytates, oxalates, carbonates, phosphates & dietary fiber, which interfere in iron absorption.

6. Vitamin B_{12} is not present in plant sources, so pure vegetarian may develop deficiency.

Non vegetarian diet

Advantages

1. Animal source of proteins are 'biologically complete', especially egg which is rich in proteins, is also called as reference protein.

2. Animal source of vitamin A is retinol, which is readily absorbed. The richest source of vitamin A is also animal origin food.

3. Vitamin D and vitamin B_{12} are found only in animal origin foods.

4. Inhibitors like oxalic acid, phytates, oxalates, carbonates, phosphates, & dietary fibre are not found, so absorption of calcium from animal sources & haem iron are very good compared to plant sources.

5. Amount of fat is more in animal sources, so they yield more energy.

6. Ideal diet for one who wants to increase body weight & muscle tissue, according to *Sāmānya siddhānta*.

मांसं मांसेन वर्धते । वृद्धि समानैः सर्वेषाम् ।

Disadvatages of nonvegetarian diet

1. Animal origin fats are not good for the body, as they contain saturated fatty acids, which increase LDL & VLDL, thus increase cholesterol & risk factor for atherosclerosis.

2. It is not indicated in disorders like Hypertension, Diabetes, coronary heart disease, obesity etc *santarpaṇottha* diseases.

3. It gives more calorie & is heavy for digestion.

4. Vitamin C is not present, minute quantities of vitamin is found in fresh meat & fish, so only non vegetarian food may lead to scurvey.

5. Animal sources of food are expensive compared to plant sources.

6. Enhances *Rājasa* quality in the mind.

In take of milk

Milk is one of best rejuvenative food according to *Caraka*. So only in *ācāra rasāyana* he suggests to consume it daily.

क्षीरघृताभ्यासं रसायनानां ।। (च.सू. २५/४०)

Suśruta considers it among *Ājasrika rasāyana*. Milk is best and complete. It is *ājanma sātmya* ie it is conducive since the birth.

स्वादु शीतं मृदुस्निग्धं बहलं श्लक्ष्णं पिच्छिलम् । गुरु मन्दं प्रसन्नं च गव्यं दशगुणं पयः ।।
तदेवगुणमेवौजः सामान्यादभिवर्धयेत्। प्रवरं जीवनीयानां क्षीरमुक्तं रसायनम्।।(च.सू.२७/२१७-२१८)

Cow's milk has sweet, cold, soft, unctous, dense, smooth, slimy, heavy, slow and clear properties. *Ojas* also has these ten properties. So milk is conducive and best rejuvenator.

Role of milk in diseases

It is best in *gulma* (tumour), *Jalodara* (Ascites), *pitta vikāra, śoṣa, vāta vyādhi* and constipation.

Role of milk in healthy

It is complete food and contains proteins, all vitamins except vitamin C & is a good source of calcium. It is conducive to children, youth and elders. It is a good demulsant, which reduces the effect of unwholesome food. Cow's milk is best, according to *Āyurveda* goats milk is best in emaciation.

Properties of Milk

Name	*Rasa*	*Guṇa*	*Vīrya*	*Vipāka*	*Karma*
1. Cow's milk	*Madhura*	*Mṛdu, snigdha, bahala, ślakṣṇa, picchila, guru, manda, prasanna*	*Śīta*	*Madhura*	*Rasāyana, Jīvanīya, Kaphakara, vāta pitta hara*
2. Bufallo's milk	*Madhura*	*Guru, Snigdha*	*Śīta*	*Madhura*	*Nidrājanana.*
3. Camel	*Madhura*	*Rūkṣa, uṣṇa, Laghu*	*Uṣṇa*	*Madhura*	*Ānāhahara Kṛmihara, śothahara, arśoghna & vāta kapha hara.*
4. Animals with hooves (ekaśapha)	*Madhura*	*Rūkṣa, Uṣṇa, Laghu.*	*Uṣṇa*	*Kaṭu*	*Balya, Sthairyakara, śakhā-vāta hara, Grāhī.*
5. Goat's milk	*Kaṣāya Madhura*	*Laghu*	*Śīta*		*Rakta pitta hara, Atisārahara kṣaya, kāsa,*
6. Sheep's milk		*Uṣṇa*	*Uṣṇa*		*Jvarāpaha, pitta kapha kara, Hikkā, śvāsa kara.*
7. Elephant's milk		*Guru*			*Balya, guru, sthairyakara.*
8. Human milk		*Snigdha*			*Jīvana, bṛṁhaṇa, sātmya, Akṣiśūla, Raktapittahara.*

Milk as medicine

1. *Stanya* (*stree dugdha*) is best *netrya* and is used for eye instillation.
2. *Kṣīrapāka* preparations are used to reduce intensity of sharp drugs.

Ideal time for intake milk

भोजनान्ते पिबेत्तक्रं वासरान्ते पिबेत् पयः । निशान्ते च पिबेद्वारि त्रिभि रोगों न जायते ।।
(अभिनव स्वस्थवृत्त)

One should consume butter milk after taking food, milk at night before sleep and water early in the morning, after getting up from sleep.

Food borne diseases

Human cysticercosis

Ingested eggs of tenia solium may disintegrate & then leave the intestine via hepatic portal system & reach to all parts of the body & develop to form cysticerci. Cesticerci developed in CNS produce neuro cysticercosis, is serious complication & dangerous to life. Clinical features like epilepsy, intracranial hypertensive syndrome, hydrocephalus, psychiatric diseases and death.

Prevention & Control measures

1. Proper treatment
2. Meat inspection
3. Health education
4. Proper sewage treatment
5. Proper cooking of meat

Management

1. Drugs like praziquantel single dose of 10 mg/kg body weight & niclosamide 2g in one dose are effective.

2. Surgical removal of cysts is possible, but once cate is seldons.

Hydatid disease (Hydatidosis)

This is zoonotic disesase mostly occurs in people who eat meat of sheep.

Problem statement

Mostly found in sheep rearing countries like Australia, Newzealand, Tansania, U.S.S.R. etc. Also found in India, especially prevalent in Andhra Pradesh & Tamilnadu.

Agent Factors– E. granulosis, E. multi locularis, E oligarthes E. Vogeli.

Life Cycle– Basically it comprises of dog (Definitive host), sheep (Intermediate host) cycle with man as an accidental host.

Host

Human relationships with animals like dogs & cats, uncontrolled slaughtering of animals & occupations like shepherds & shoe makers in endemic area.

Means of transmission

Intake of food contaminated with eggs, unwashed vegetable's or contaminated water lead to hydatidosis.

Incubation period– Variable from months to years.

Clinical features

These are manifested after many years of exposure, cysts grow slowly from 5-20 years, then diagnosed. The size of cyst is variable from pin head size to small foot ball. More than 70% are located in right lobe of liver & rest in lung, brain, peritoneum, long bones & kidney. Cysts are filled with watery fluid & contain large number of tape worm heads. Small cysts are usually asymptomatic, later produce pressure symptoms and jaundice. In vital organ, it may produce death. Diagnosis is done by X-rays, ultrasonography & CT scan and ELISA among serological tests is sensitive test.

Treatment

Ideal is surgical removal of cyst.

Mebendazole is also a drug of choice.

Prevention

1. Proper inspection of slaughter houses.
2. Elimination of stray dogs
3. Health education.

Food poisoning

It is of two types

1. Non bacterial–Ex. fertilizers, pesticides, cadmium, mercury
2. Bacterial salmonella, staphylococcal, Botulism, Cl. perfringence, & cerus food poisoning.

Food poisoning

Name of food Poisoning	Agents	Source	Incubation Period	Mechanism of food poisoning	Clinical features
1. Salmenella food poisoning	S.Typhimurium S. cholerasuis S.enteritidis	Contaminated meat, milk produces egg etc, rats & mice	12-24 hours	After ingestion organism multiply & produce acute enteritis & colitis	Sudden onset with chills, fever, nausea, vomiting,profuse watery diarrhoea lasts for 2-3 days. mortality is about 1%.
2. Staphylo coccal food poisoning	Staphylococcal aureus, Toxins are formed at optimum temp of 35^0C-37^0 C. They are heat stable & resist boiling for 30 min or more.	Found in skin, nose & throat of men & animals	1-6 hrs.	Ingestion of toxin preformed in the food	Toxins act directly on the intestines & CNS Features are sudden onset of vomiting, abdominal cramps & diarrhoea. In severe cases blood & mucous may appear, rarely fever occurs & death is rare.
3. Botulism	Exotoxin of clostridium botulinum A, B or E	Soil, dust, intestine of animals Mostly home canned vegetables	12-36hrs	Toxin is preformed in food. It acts on parasympathetic nervous system.	Common symptons are Dysphagia, ptosis, dysarthria, blurring of vision, muscle weakness & even quadriplegia, condition is fatal commonly, death occuring with in 4-8 days due to cardiac or respiratory failure.
4. Cl. perfringens	Cl. Perfringens	faeces of humans animals soil, water & air.	6-24 hrs	If cooked meat & poultry are not cooled properly	Common symptoms are diarrhoea, abdominal cramps, little or no fever. Nausea & vomiting rare, recovery with in 1 day & no death reported.

Effects of condiments & spices in food on the body

(1) These usually give taste to the food, thus makes the person consume more food than necessary. This may result in obesity & other diseases due to over nourishment.

(2) Excess use of spices especially pepper, chilly etc may result in diseases like hyperacidity, ulcers & gastritis.

(3) Use of more condiments & spices is not conducive in the disease like diabetes mellitus, cardiovascular disease & hypertension.

(4) They enhance *Agni*, if used in the right proportions. So they help in digestion & also can be used judiciously in all kinds of digestive disorders.

Effects of intoxicating drugs on the body

Drug of Abuse– A drug of abuse is any substance taken through any route of administration that alters the mood level of perception or brain functioning .

Drug abuse– Use of mind altering substance in a diffent way from generally approved medical or social practices.

Dependence– Habituation or compulsive use is psychological or physical need for the drug.

Tolerance– Toleration of higher and higher doses of the drug or requirement of higher and higher amount of drug to produce the same effect due to alteration in drug metabolism, where in liver destroys the substance more quickly.

Appearance of physiological symptoms, when drug is stopped suddenly, is with drawal effect.

Classification

Class	*Example*
General CNS depressant	Alcohol, hypnotics, antianxiety drugs
CNS sympathomematic or stimulants	Amphetamine, methyl phenidate, cocaine, weightloss product
Opiates	Heroin, morphine, methadone propoxyphene
Cannabinoids	Marijuana, Hashish.
Psychotics, hallucinogens	LSD, mescaline psilosybine
Solvents	Aerosol, sprays, glue, toluene, gasoline, paint thinner.
Over the counter drug	contain atropine, scorpolamine antihistamine
Other	Phencyclidine, bromide.

Drugs	Medical usage	Therapeutic doses	Action	Effects on body
1. Amphetamine & synthetic drugs	Obesity, mild depression,narcolepsy, certian behavior disorder in children	10-30mg /day	CNS	Mood elevation, elation, feeling of well being, increased alertness & sense of hightened awareness, increases self confidence, energy & endurance power
2. Cocaine	Potential local anaesthetic, CNS stimulant	–	CNS Stimulant	Sense of excitement, hightened & distorted awareness & hallucination. Produces no dependence or no withdrawal symptoms
3. Barbiturates	Major ingredient in sleeping pills	–	sedate	Act as sedatives. Drug users prefer short acting barbiturate such as pentobarbital, secobarbital to long acting ones. Leads to increasing both physical & psychological dependence & worst suffering.
4. Cannabis exudate of flowers of female plant-Hashish. Dried leaves & flowering shoots-Bhang, small leaves & brackets inflouroscence Ganja All parts of plants is called marijuana	–	–	–	Dreamy state,altered conciousness,relaxation, euphoria, increased tendency to laugh, greater awareness of colours & space. There is psychic dependence.

Drugs	Medical usage doses	Therap-eutic	Action	Effects on body
5. Heroin	Narcotic analgesic	–	Anal-gesic	worst types of addiction, as it produces craving. Develops psychotic dependence very fast. tolerance develops very fast leading to increase in doses to have desired effect.
6. Caffeine Most common drink	–	–	CNS stimu-lant	Anxiety, agitation, restlessness, insomnia, head ache & somatic complaints similar to heart & gastrointestinal tract. With drawal may lead to headache irritability, lethargy & occassional nausea.

Agents– Alcohols, opioids, cannabinoids, sedatives or hypnotics, cocain, hallucinogens, tobacco etc are considered as intoxicating drugs.

Symptions of drug addictions

Loss of interest in daily routine, loss of appetite & body weight, unsteady gait, odd movements, tremors, reddening, puffyness of eyes, diseases of vision, slurring of speech, fresh injection marks on the body, nausea, vomiting, body pain, drowsiness, sleeplessness, lethargy, acute anxiety, depression, profuse sweating, changing mood & temper, emotional detatchment, change in personality, impared memory & concentation are different features of drugs addiction.

Treatment

1. Identification of addicts & motivating them for detoxication.
2. Detoxication by hospitalization in drug addiction centres.
3. Councilling, follow ups & emotional care.
4. Rehabilitation.

Smoking & its effects on the body

Most of smokers start in their adolescence, environmental behavioral, personal factors play important role.

Causes

Environmental– Parental smoking (twice as likely to smoke) smoking by siblings and friends, advertising and promotions targeting young people & deprived back grounds.

Behavioral

It is linked to poor school performance, training, early dropouts, associated with other behavioral problems, alcohol and other drug misuses.

Personal– Low self esteem, low knowledge of adverse effects, anxiety, depression.

Most of the smokers want to quit, only one in 5 smokers, in 16-24 year age group has neither tried to or want to give up smoking.

Smoking is more common in psychiatric diseases, unemployed people, heavy drinker, schizophrenics, lone parents, drugs addicts, depressive disorders, homeless, prisoners & neurotic disorders.

Short term effect

Effects —— Active smoker
—— Passive smoker

Cigaratte smoke contains about 4000 chemicals nicotine, carbon monoxide, ammonia, arsenic etc. At least 50 chemical in tobacco smoke are known to cause cancer of lung, throat, mouth, bladder & kidneys. They are irritant to lungs & cause body to increase the production of mucous to remove irritant substance, also resulting in cough. The hair like cilia lining the air passage are damaged and cannot fulfil their function of ridding lungs of these irritant particles, further increasing the need to caugh.

Nicotine is a powerful drug, which acts as stimulant and responsible for the tobacco dependance. After inhalation tobacco passes rapidly to brain (in about 7 seconds from lung to brain) and into blood stream.

Nicotine chewing is absorbed more slowly through lining of mouth.

Nicotine acts in number of ways

Releases adrenalin into blood, thus increasing heart rate and B.P., constrict arteries & effects are worsened by gradual build up of fatty substance in walls of blood vessels, it is partly due to effects of nicotine.

Carbon monooxide

Combines with Hb, reduces ability to carry oxygen and reduced oxygen level leads to breathlessness. Over a long time air way swells up and lets less air into lungs.

Tar

Collective name for many chemicals that form thick sticky residue of tobacco smoke.

Tar coats the lungs and cause cancer. Changing to low tar cigarettes does not help, as they take deeper puff and hold smoke in for longer, dragging tar deeper into lung tissue.

Long term effect

(1) **Shortening of life–** 5 minutes of life reduces with each cigaratte on average, those killed by smoking have lost 10-15 yrs of life.

Smoking and cancer

1. Mouth, throat and esophagus, occur upto 10 times more frequently than non smokers.

2. Death from lung cancer is related to number of cigarettes smoked, age of starting, the risk is marginally reduced by using filtered cigarette.

3. Low tar cigarette is related with dramatic increase in previously rare form of lung cancer adeno carcinoma.

4. Pipe and cigar smokers who never smoke cigarette have relatively less risk of lung cancer.

5. All forms of smoking cause cancer.

Chest condition

Chronic inflammation & irritation of respiratory tract, lead to destruction of air sacs (emphysema) and production of excess mucous causes obstruction and narrowing of small air ways, leading to gradual onset of bronchitis & smoker's cough. When half of lung tissue is destroyed dyspnoea is troblesome. Many changes are progressive and irreversible.

Heart and circulation

Incidence of coronary heart disease is twice as likely than non smoker. Smoking is more dangerous in persons with high blood pressure, cholesterol and CHD. 95% people have arterial disease of leg like Thrombo anginitis obliterance.

Diabetes

Smoker with diabetes mellitus is 3 times more at risk of heart attack.

Women

Women using oral contraceptive pills along with smoking are more at risk of heart attack and stroke. Osteoporotic bone loss is more in smoker. Risk of cervical cancer is twice compared to non smoker. Menopause sets about 3 years earlier than non smoker.

Pregnancy

Nicotine and carbon monoxide in cigarette harms the baby, produces growth retardation and low birth weight. Chances of premature delivary and still birth are more.

Smoking reduces immune defence mechanism and chances of infection is more.

Appearance

Smoking effects blood vessels in skin, damages facial colour, complexion, produces wrinkle around eye & mouth early, stains teeth & finger.

Children exposed to side stream smoke

They are prone to chest infection, asthma attack, hospital admission, irritation to throat, eye and respiratory tract.

Stopping Process. 4 A's

Ask–	about smoking at every opportunity
Advice–	All smokers to stop.
Assist–	Smokers to stop.
Arrange–	for follow ups.

4 D's

–Delay acting on urge to smoke
–Deeply breath when you have urge of smoking
–Drink water slowly sip by sip.
–Do some thing else.

Practice of *Prāṇāyāma* and meditation along with *Āsanas* helps to control the mind and help to overcome the urge and mental tension produced due to with drawal of smoking. Intake of *Yaṣṭimadhu Kṣīrapāka* helps to over come gastrointestinal symptoms produced due to smoking.

Alcohol intoxication (मदात्यय)

विधिना मात्रया काले हितैरन्नैर्यथा बलम्। प्रहृष्टो यः पिबेन्मद्यं तस्य स्यादमृतं तथा।। (च.सू.२४/२७)
मद्यं हृदयमाविश्य स्वगुणैरोजसो गुणान्। दशभिर्दशसंक्षोभ्य चेतो नयति विक्रियाम्।। (च.सू.२४/२९)
लघूष्णतीक्ष्णसूक्ष्माम्लव्यवाय्याशुगमेव च। रुक्षं विकासी विशदं मद्यं दशगुणं स्मृतं।। (च.सू.२४/३०)

Alcohol consumed according to dose and condition along with food in pleasent state of mind act as nector. If consumed in excess it takes shulter in heart and produces adverse effects on *ojas,* as it has qualities opposite to that of ojas. Alcohol has light, hot, sharp, minute, sour, fast spreading, instantaneous effects, dry & nonsliminess qualities.

अतिपीतेन मद्येन विहतेनौजसा च तत्। हृदयं याति विकृति तत्रस्था ये च धातवः।।(च.चि.२४/३६)

When a person consumes alcohol in excess, the *ojas* gets destroyed, due to this the seat of *ojas* ie heart gets vitiated. As the heart is vitiated the site of origin of the *dhātu* and the mind, intellect, sense organs & soul which are residing in the heart get vitiated.

Three stages of Madātyaya

ओजस्यविहतो पूर्वो हृदि च प्रतिबोधिते। मध्यमो विहतेऽल्पे च विहते तूत्तमो मदः ।।
(च.चि. २४/३७)

1. First stage– Here the *ojas* is in the normal state and the other things like intellect, which is residing in the heart are in the normal condition and are performing their respective function.

2. Second stage– *ojas* is vitated to less extent

3. Third stage– Specially *ojas* is destroyed (ओजो विघात)

Features of intoxication

हृदि मद्यगुणाविष्टे हर्षस्तर्षो रतिः सुखम् । विकारश्च यथासत्वं चित्ता राजसतामसाः ।।
जायन्ते मोहनिद्रांता मद्यस्यातिनिषेवणात्। स मद्यविभ्रमो नाम्ना मद इत्यभिधीयते।।(च.चि.२४/३९-४०)

Due to the excessive consumption of alcohol, qualities of alcohol enter the heart, produce happiness, increased thirst, sense of well being, stupor & sleep, according to *rājasa* and *tāmasa* characters of mind.

First stage

Mind will be in alert state in first stage of *Mada*.

प्रहर्षणः प्रीतीकारः पानान्नगुणदर्शकः । वाद्यगीत प्रहासानां कथानां च प्रवर्तकः ।।
न च बुद्धिस्मृतिहरो विषयेषु न चाक्षमः। सुखनिद्रा प्रबोधश्च प्रथम सुखदो मदः।।(च.चि.२४/४२-४३)

The person has a pleasurable sensation. As the food taken produce good effects on the body, drinking of alcohol produces good effects in first stage. The person indulges in singing, playing instrument, joking, telling stories etc. The intellect and memory are not affected. The senses are in their normal condition. He gets good sleep and gets up comfortably.

second stage (द्वितीयावस्था)

मुहुः स्मृतिर्मुहुर्मोहोऽव्यक्ता सज्जति वाङ्मुहुः । युक्तायुक्तप्रलापश्च प्रचलायनमेव च ।।
स्थानपानान्नसांकथ्ययोजना सविपर्यया । लिङ्गान्येतानि जानीयादाविष्टे मध्यमे मदे ।।
(च.चि.२४/४४-४५)

In this stage, some times person has proper memory, some times he has loss of memory.The speech is obstructed or the speech is slurred (not clear). Some times talks irrelevant some times relevent, has giddiness. The person sits in one place, drinks water, takes food, tells stories, while doing these things some times does properly, some times improperly. Some times he is disturbed, some times runs away.

Stage between second and third stage (मध्यम एवं उत्तममद मध्यावस्था)

मध्यमं मदमुत्क्रम्य मदमाप्राप्य चोत्तमम् । न किञ्चिन्नाशुभ कुर्यान्निरा राजसतामसाः ।।
को मदं तादृशं विद्वानुन्मादमिव दारुणं। गच्छेदध्वानमस्त्वन्तं बहुदोषमिवाध्वगः।।(च.चि.२४/४६-४७)

The intermediate stage between the middle and superior intoxication. In this *rājas* and *tāmas* qualities are predominant, the person does all the bad deeds. The vitiation of *doṣas* is to the maximum extent and is in the path of destruction.

Third stage (तृतीयं मद)

तृतीयं मदं प्राप्य भग्न दार्विव निष्क्रियः । मदमोहावृत मना जीवन्नपि मृतैः समः ।।
रमणीयान् स विषयान्न वेत्ति न सुहृज्जनम् । यदर्थं पीयते मद्यं रतिं तां च न विन्दति ।।
कार्याकार्यं सुखं दुःखं लोके यच्च हिताहितं । यदवस्थो न जानाति कोऽवस्था तां व्रजेत् बुधः ।।
स दूष्यः सर्वभूतानां निंद्याश्चाग्राह्य एव च। व्यसनित्वादुदर्के च स दुःख व्याधिमश्नुते ।।
(च.चि.२४/४८-५१)

In the third stage, the person falls down like a broken wooden log. He cannot do any work and is unconscious. Intoxication and semiconsciosness envelop his mind. He cannot percieve any beautiful thing & cannot recognise his friends. He can not experience the pleasure for which he is drinking. He will not be in a position to know what to do what not to do, what is good or what is bad, which should be discarded & which should be used. No one should drink to this extent.

कफस्थानानुपूर्व्या च क्रिया कार्या मदात्यये। पित्तमारुत पर्यन्तः प्रायेण हि मदात्ययः।।(च.चि.२४/१०८)

The *Kaphahara* treatment should be followed because the involvement of *pitta* & *vāta* is in the end.

Indications of alcohol as treatment (मद्यप्रयोग श्रेष्ठ)

मद्योत्क्लिष्टेन दोषेण रुद्धः स्रोतस्सु मारुतः । करोति वेदना तीव्रा शिरस्यस्थिषु सन्धिषु ।।
दोषविष्यन्दनार्थं हि तस्मै मद्यं विशेषतः । व्यवायी तीक्ष्णोष्णतया देयमम्लेषु सस्त्वपि ।।
(च.चि.२४/११८)

There is severe pain in the head, bones, joints due to the obstruction caused by the vitiated *vāta*, so to moisten the *doṣas* alcohol with Vyavāyī, Tīkṣṇa & uṣṇa quality should be given.

स्रोतोविबन्धनुन्मन्द्यं मारुतस्यानुलोमनम् । रोचनं दीपनं चाग्नेरभ्यासात् सात्म्यमेव च ।।
(च.चि.२४/११९)

Madya clears obstruction, pacifies *doṣa*, gives taste, enhances *Agni* and becomes conducive on frequent consumption.

Treatment of alcohol intoxication

बीजपूरकादि संस्कृत मद्य	Alcohol prepared by using *bījapūra*
खर्जुरादिमन्थ	Kharjūrādi mantha
दुग्ध प्रयोग	Use of milk.

With drawal symptoms

विच्छिन्नमद्यः सहसा योऽतिमद्यं निषेवते । ध्वंसको विक्षयश्चैव रोगस्तस्योपजायते ।।
व्याध्युपक्षीण देहस्य दुश्चिकित्स्यतमौ हि तौ ।। (च.चि.२४/२०१-२०२)

If one consumes alcohol in excess quantity after withdrawal, he develops *Dhvaṁsaka* and *vikṣaya* disease.

Dhvaṁsaka

श्लेष्मप्रसेकः कण्ठास्यशोषः शब्दासहिष्णुता । तन्द्रानिद्रातियोगश्च ज्ञेयः ध्वंसक लक्षण ।।
(च.चि.२४/१९९)

Oozing of *kapha*, dryness of throat and mouth, intolerance to noise, drowsiness and excessive sleep are the features of dhvaṁsaka.

Vikṣaya (विक्षय)

हृत्कण्ठरोग: संमोहछर्दिरंगरुजाज्वर:। तृष्णा कास: शिर:शूलमेतद्विक्षयलक्षणम्। ।(च.चि.२४/२००)

Disorders of heart, throat, stupor, vomiting, body ache, fever, thirst, cough & head ache are the features of *Vikṣaya.*

Rough correlation between Blood alcohol level and Behavioral or motor impairment

Rise in blood alcohol level in blood mg%	Expected effect
1. 20-99	Impaired coordination
2. 100-199	Ataxia, poor judgement
3. 200-299	Marked ataxia, slurred speech, poor judgement, labile mood, nausia, vomiting
4. 300-399	Anaesthesia, memory lapse, labile mood,
5. 400-above	Respiratory failure, coma, death

Effects on the body

(1) Gastrointestinal system-Alcoholism is associated with high rates of cancer of all levels of digestive tract. Specifically oesophagus, stomach, high rates of ulcer disease, elavated rates of inflammation of the stomach (gastritis), pancreatitis, fatty liver, alcoholic hepatitis & cirrhosis. Alcohol disturbs the abitity of liver to produce gluconeogenesis & shunts building blocks into production of fats.

(2) Nervous System- Chronic intake of alcohol results in deterioration of peripheral nerves (5-15%), temporary as well as permanent organic brain syndrome, associated with both direct effect of alcohol and specific vitamin defeciency such as thiamine related Wornicke Korsakoff syndrome. 15-30% of patients with organic brain syndromes are alcoholics.

(3) CVS– Quarter of alcoholics develop heart disease, myocardiopathy, heart inflammation, hypertension, elevated blood fats & cholesterol.

(4) Decreases production of RBC, leads to macrocytosis due to folic acid deficiency, decreases production of efficiency of the WBC & decreases production of clotting factor. It results in decrease in

thymus derived lymphocytes which may relate to the rates of cancer in alcoholics.

(5) Body muscles are sensitive to alcohol and alcohol results in inflammation or in chronic abuses muscle wasting, primarily in shoulder and hips.

(6) Number of mechanisms induce a number of other blood test abnormalities including liver function, glucose, blood components, creatinine phosphokinase (CPK) and uric acid.

Effects on the mental process are with moderate intake at peak or decreasing alcohol levels, most people experience sadness, anxiety, irritability, insomnia, decreased sexual potency (for males) and results in many interpersonal problems.

At persistant higher doses, alcohol can cause almost any psychiatric symptoms, including temporary pictures of intense sadness and auditary hallucinations.

Schedule for giving up addictions

उचितादहिताद्धीमान् क्रमशो विरमेन्नरः । हितं क्रमेण सेवेत क्रमश्चात्रोपदिश्यते ।।
प्रक्षेपापचये ताभ्यां क्रमः पादांशिको भवेत् । एकान्तरं ततश्चोर्ध्वं द्व्यन्तरं त्र्यन्तरं तथा ।।

(च.सू.७/३६-३७)

An intelligent person should gradually discontinue unwhole some practices to which he is addicted & should adopt wholesome practices correspondingly.

On the first day, quarter of unwholesome habit should be given up & quarter of wholesome habit should be adopted, on second day half of unwholesome practice should be given up & half of whole some practice should be adopted. This is continued on third day also, on the fourth day 3/4 of unwholesome practice should be given up & 3/4 of wholesome practice should be adopted, same is continued for 5th & 6th day. The process of giving up unwholesome habits & adoption of wholesome habits is fully complete on the 7th day.

Importance

क्रमेणापचिता दोषाः क्रमेणोपचिता गुणाः । सन्तो यान्त्यपुनर्भावमप्रकम्प्या भवन्ति च ।।

(च.सू. ७/३८)

Gradual withdrawal of unwholesome practices & adoption of wholesome practices, results in eradication of unwholesome practices for ever & adoption of wholesome practices completely.

Chapter- 12

SLEEP

Definition (निरुक्ति)

यदा तु मनसि क्लान्ते कर्मात्मिनःक्लमान्विताः। विषयेभ्यो निवर्तन्ते तदा स्वपति मानवः।।(च.सू.२१/३५)
क्लान्त–निष्क्रिय, कर्मात्मनः इन्द्रियाणि, क्लमान्वित क्रियारहित विषयेभ्यः रूप स्वप्नश्च निरिन्द्रियप्रदेशे मनोवस्थानम् । (च.पा.)

When the mind & *indriyas* get exhausted, they withdraw them selves from their objects & the individual sleeps.

Sleep is nothing but location of mind in a place unconnected with sensory & motor organs.

Proper Sleep (योग्य निद्रा)

रात्रिस्वभाव प्रभावा मता या तां भूतधात्रीं प्रवदन्ति तज्ज्ञाः । भूतानि तानि प्राणिनो दधाति पुष्णाति इति भूतधात्री, धात्रीव धात्री । (च.सू. २१/५९, च.पा.)

The sleep caused by nature of night is excellent sleep. It keeps every one lively, nourishes them like mother, so called as *Bhūtadhātri*.

निद्रां तु वैष्णवीं पाप्मानमुपदिशन्ति सा स्वभावतः एव सर्वप्राणिनोऽभिस्पृषति ।। (सु.शा.४/३२)

It is like *māya* of *viṣṇu,* it naturally comes to all beings. It is also known as *pāpini* as it destroys all means, through which good action can be done at that time.

Proper way to sleep

स्वास्तीर्णं शयन वेश्म सुखं कालस्यतोचितं । आनयन्त्याचिरात्रिद्रां प्रनष्टा या निमित्ततः।।
(च.सू.२१/५४)

Over a comfortable bed in home & at proper time at which sleep is accostomed, one should go to sleep.

Relation of sleep with Health (निद्रा एवं स्वास्थ्य)

निद्रायत्तं सुखं दुःखं पुष्टिः कार्श्यं बलाबलं । वृषता क्लीबता ज्ञानमज्ञानं जीवितं न च ।।
अकालेऽतिप्रसङ्गच्च न च निद्रा निषेविता । सुखायुषी पराकुर्यात् कालरात्रिरिवापरा ।।
सैवयुक्ता पुनर्युंक्ते निद्रा देहं सुखायुषा । पुरुषं योगिनं सिध्द्या सत्या बुद्धिरिवागता ।।
(च.सू.२१/३६-३८)

Happiness, misery, nourishment, emaciation, strength, weakness, sterility, virility, knowledge, ignorance, life & death, all are dependent on proper or improper sleep.

Untimely sleep & excessive sleep take away both happiness & longevity like Kāla rātri ie fierceful night. At the same time if properly enjoyed, they bring about happiness, longevity to human being as real knowledge ie *satyā buddhi* brings about *siddhi* to *yogi.*

Relation of sleep with nourishment & malnourishment of the body (शरीरपुष्टि शरीर अपुष्टि तथा निद्रा)

रात्रौ जागरणं रूक्षं स्निग्धं प्रस्वपनं दिवा। अरूक्षमनभिष्यन्दि त्वासीनप्रचलायनं।। (च.सू.२१/५०)
देहवृत्तौ यथाऽहारस्तथा स्वप्न सुखी मतः। स्वप्नाहार समुत्थे च स्थौल्य कार्श्ये विशेषतः ।।

Awakening at the night increase dryness in the body. Daysleep increase unctousness in the body & sleeping in sitting posture during day time does not increase unctousness or dryness.

Like the proper diet, proper sleep is essential for maintenance of the body. Proper sleep increase weight, induces obesity where as less sleep produce emaciation.

Production of sleep

तमोभिभूते तस्मिन् तु निद्रा विशति देहिनां । निद्रा हेतुः तमः, सत्वं बोधने हेतुरुच्यते ।।
स्वभाव एव वा हेतुर्गरीयान् परिकीर्त्यते ।। (सु.सू. ५/३५)

When *tamas* increases the person sleeps. When *satva* increases person awakens. Naturally the *tamas & satva* qualites alternately are held responsible for sleep & awakening.

Effects on heart

पुण्डरीकेण सदृशं हृदयं स्यादधोमुखम्। जागृतस्तद्विकसति स्वपतश्च निमीलति।।(सु.शा.४/३१)

Heart which is like the lotus in the downward direction, blooms in wakeful state & closes while asleep.

Types of sleep (निद्राभेद)

तमोभावा श्लेष्मसमुद्भवा च मनः शरीर श्रमसंभवा च ।
अगंतुकी व्याध्यनुवर्तिनी च रात्रिस्वभावाप्रभवा च निद्रा ।। (च.सू. २१/५८)

1.Tamobhava nidra (तमोभवा)

यदा संज्ञावहानि स्रोतांसि तमोभूयिष्ठः श्लेष्मा प्रतिपद्यते तदा तमसी नाम निद्रा संभवत्यनवबोधनी सा प्रलयकाले । तमोभूयिष्ठानामाहःसु निशासु च भवति ।। (च.शा.४/३३)

When the channels responsible for consciousness get influenced by *tamas,* then *tamosaṁbhava* sleep is produced, it is difficult to arouse a person from sleep, usually it occurs duing time of *pralaya.* The person sleeps day & night.

Unhealthy sleep (अहित निद्रा)

तमोभवामाहुरघस्य मूलं शेषाः पुनर्व्याधिषु निर्दिशन्ति । (च.सू. २१/५९)
आगन्तुकी असाध्यव्याधिसंभवा च स्वयमबप्यसाध्यभूता व्याधिरूपा ।। (च.पा. च.सू. २१/५४)

The sleep produced due to *tamas* is the root for bad deeds & produced due to diseases. Other than that day sleep leads to diseases like obesity & diseases due to over nourishment.

2. Ṣleṣma samudbhava (श्लेष्मसमुद्भव निद्रा)

This type of sleep is produced due to aggravation of *kapha.*

3. Manah śramasaṁbhava (मनःश्रमसम्भव निद्रा)

This sleep is produced due to mental exhaustion

4. Śarīra śrama saṁbhava (शरीरश्रम संभवनिद्रा)

This sleep is produced due to physical exhaustion.

5. Āgantuka/riṣṭa bhūta (आगन्तुक/रिष्टभूतनिद्रा)

Produced due to *tamas,* with bad signs without any disease is *Āgantuki* sleep.

6. Vyādhyanuvartini (व्याध्यनुवर्तिनी निद्रा)

Sleep produced due to *kapha* disorder is *vyādhyanuvartini.*

7. Rātrisvabhāva prabhāva (रात्रिस्वभावप्रभाव निद्रा)

It is natural sleep which occurs duing night. In the person with predominent *satva guṇa,* sleep is produced at midnight. Aggravation of *vāta*, depletion of *kapha*, mental & physical diseases lead to improper sleep.

Diseases produced due to improper sleep

हलीमक शिरोजाड्य स्थैमित्य गुरुगात्रता । ज्वरभ्रममतिभ्रंशस्रोतोरोधाग्निमन्दता ।।
शोफारोचक हल्लास पीनसार्धावभेदकाः । कण्डू रुक् कोठ पिडका कासस्तन्द्रा गलामयाः ।।
विषवेगप्रवृत्तिश्च भवेदहितनिद्रया ।। (अ.सं.सू ९/४९-५१)

Improper sleep will lead to different diseases like *Halīmaka* (type of jaundice), head ache, heavyness of the body, fever, giddiness, mental disturbances, obstruction of channels, diminition of *Agni*, oedema, tastelessness, nausia, rhinitis, half sided head ache, itching, body ache, urticaria, ulcers, cough, drowsiness, disease of throat & features of poisoning.

निद्रातियोगे वमनं हितं संशोधनानि च। लंघनं रक्तमीषच्चश्च मनोत्याकुलनानि च।। (सु.शा.४/४६)

Excessive sleep should be treated by emesis, purification procedures, *laṅghana*, blood letting & mental stimulants.

Causes for sleeplessness (अनिन्द्रा निदान)

कायस्य शिरसश्चैव विरेकश्छर्दनं भयं । चिन्ताक्रोधस्तथा धूमो व्यायामो रक्तमोक्षणं ।।
उपवासोऽसुखा शय्या सत्वौदार्यं तमोजयः । निद्रा प्रसंगमहितं वारयन्ति समुत्थितम् ।।
एत एव विज्ञेया निद्रा नाशस्य हेतवः। कार्यं कालो विकारश्च प्रकृतिर्वायुरेव च।।(च.सू.२१/५५-५७)
सत्वगुण वर्धन, तमोगुणजय–योगाभ्यासादिना काल इति वार्धक्यं, वृद्धा हि स्वभावतः जागरूकाः भवंति विकारः व्याधि शूलादि, प्रकृति स्वभाव । (च.पा.)

Elimination of *doṣas* from the body & head through nasal instillation, purgation, emesis etc purification, blood letting, worries, anger, smoke, physical exercise, fasting, uncomfortable bed, predominance of *Satva*, supression of *Tamas*, over work, old age, by yoga, disease, *vāta vṛddhi* & basic nature are the causes of insomnia.

Methods & measures to induce sleep

अभ्यङ्गोत्सादनं स्नानं ग्राम्यानूपौदकाः रसाः । शाल्यन्नं सदधि क्षीरं स्नेहो मद्यं मनःसुखम् ।।
मनसोऽनुगुणाः गन्धा शब्दाः संवहनानि च । स्वस्तीर्णं शयनं वेश्म सुखं कालस्तथोन्वितः।।
आनयन्त्याचिरान्निद्रां प्रनष्टा या निमित्ततः । (च.सू. २१/५२-५४)

Sleeplessness can be treated by massage, unction, bath, soup of domestic, marshy & aquatic animals, *śāli rice* with curds, unctous substance, milk, alcohol & psychic pleasure, smell of scents & hearing of sounds of ones own taste, comfortable touch, application of anointments to body, *Tarpaṇa* for eyes, comfortable bed, home & sleeping at proper time.

Indications for day sleep

गीताध्ययनमद्यस्त्रीकर्मभाराध्व कर्षिताः । अजीर्णिनः क्षताः क्षीणा वृद्धा बालस्तथाऽबलाः।।
तृष्णातिसार शूलार्ताः श्वासिनो हिक्किनः कृशाः ।
पतिताभिहतोन्मत्ताः क्लान्ताः यान प्रजागरैः । क्रोधशोकभय क्लान्ता दिवास्वप्नोचिताश्चये ।।
सर्व एते दिवा स्वप्नं सेवेरन् सर्व कालिकम् । धातु साम्यं तथाह्येषां बलं चाप्युपजायते ।।
श्लेष्मा पुष्णाति चाङ्गानि स्थैर्यं भवति चायुषः। ग्रीष्मे त्वादान रूक्षाणां वर्धमाने च मारुते ।
रात्रीणां चातिसंक्षेपात् दिवास्वप्नः प्रशस्यते ।। (च.सू. २१/३९-४३)
अतिसारादि प्रभाविना दिवास्वप्न अजीर्ण–निद्रा हि स्रोतोज्वरोधेनाग्निबलं कृत्वा शीघ्रमाहारं पचति ।
दिवास्वप्नसात्म्यानां सहसा तत् परित्यागे दोष ।
प्रजागर–तथोअर्धमात्रं तत्कालं दिवास्वप्न विधीयते भुक्त्वा स्वप्नं न सेवेत सुस्थोप्यसुखितो भवेत् ।।
नरान्निरशनांतन् कामं दिवा स्वापयेत् ।। रात्रिणां अतिसंक्षोभत्वात् अल्पनिद्रत्वं सूचयति ।। (च.पा.)

Sleeping during day time is prescribed for those who are emaciated by singing, study, alcoholic drinks, sexual act, elimination therapy, carrying heavy weight, walking long distance, suffering

from pthisis, wasting, thirst, diarrhoea, colic pain, dyspnoea, hiccough, insanity, those who are too old, too young, weak, emaciated, injured by fall, assault, exhausted by journey, vigil, anger, grief, fear & those accostomed to day sleep.

In summer when nights are shorter, *vāta* gets aggravated in the body due to absorption of fluid, so day sleep is prescribed for all.

Sleep as a nonsupressible (Adhāraṇīya vega)

वेगान्नधारयेद्वात विण्मूत्र क्षवतृट्क्षधां। निद्राकास श्रम श्वास जृम्भाश्रुछर्दिरेतसां।। (अ.हृ.सू.४/१)

It is one among the urges which should not be controlled. If controlled produces various diseases.

Sleep is defined as unconsciousness from which the person can be aroused by sensory or other stimuli.

Types —
- Slow wave sleep (NREM)
- REM sleep (paradoxical or desynchronised sleep)

Deep sleep occuring in the first hour after the wakefulness for a day is slow wave sleep. It is exceedingly restful, associated with decrease in peripheral vascular tone, 10 to 30% decrease in blood pressure respiratory rate and basal metabolic rate along with other functions of the body. It is frequently called dreamless sleep.

The eyes undergo rapid movements even when person is asleep. Episodes of REM occur at every 90 minutes, lasting for about 5 to 30 minutes. This state is associated with active dreaming.

Different theories of production of sleep

1. Reticular activating reflex and other parts of the brain are fatigued over the period of waking day. So they become inactive and produce sleep.

2. Some centre or centres below midpontile level of brain produce sleep.

3. Diencephalon sleep zone, basal fore brain sleep zone, parts of hypothalumus and suprachiasmatic nuclei are responsible for production of sleep. The production of sleep follows circadian rythm.

Chapter- 13
CELIBACY

Definition (निरुक्ति)

कर्मणा मनसा वाचा सर्वावस्थासु सर्वदा । सर्वत्र मैथुनं त्यागं ब्रह्मचर्य प्रचक्षते। ।(वासिष्ठ संहिता)

Avoidance of sexual act physically, mentally & verbally always under any circumstances is known as celibacy (*brahmacarya*)

ब्रह्मचर्य शब्देन इन्द्रियसंयम सौमनस्य प्रभृतयो ब्रह्मज्ञानानुगुणा गृह्यन्ते ।। (च.पा.)

Brahmacarya is control over genital organ, which leads to pleasent mind & helpful to attain knowledge about *brahma* ie supreme god.

ब्रह्मचर्यं गुप्तेन्द्रियोपस्थस्य संयमम् ।

Brahmacarya is nothing, but control over hidden sex organ ie *upasthā*.

Characters of Celibacy (ब्रह्मचर्य लक्षण)

स्मरणं कीर्तनं केली प्रेक्षणं गुह्यभाषणं । संकल्पध्यवसायश्च क्रियानिर्वृत्तिरेव च ।।
एतन्मैथुनमष्टाङ्गम् प्रवक्ष्यन्ति मनीषिणः । विपरीतं ब्रह्मचर्यं मेतदेवाष्ट लक्षणम् ।।

Remembering, talking, fore play, secret talks, deciding to have sex, beginning of the act & completing the coitus are eight steps of sexual act, complete abstinence from these *Aṣṭāṅgas* is called *Brahmacarya or* celibacy.

But it is difficult to follow strict abstinence for everyone, so *vāgbhaṭa* indicates *abrahmacarya*.

शरीरे जायते नित्यं देहिनः सुरतस्पृहा। अव्यवायान्मेहमेदोवृद्धिः शिथिलता तनोः।।
(भा.प्र.पू.५/२८०)

According to *Bhāvaprakāśa* a person gets the desire for cohabitation, if it is not fulfilled then he may develop many diseases like *meha* (urinary disorder), *medovṛddhi* (increase of fat), loseness in the body & psychosomatic diseases.

Formation of Vīrya (वीर्योत्पत्ति)

Kṣīra dadhī nyāya (क्षीर दधिन्याय)

रसाद्रक्तं ततोमांसमांसात् मेदो तथोस्थि च । अस्थिनो मज्जा ततः शुक्रं शुक्रात् गर्भप्रजायते ।।
(च.चि.१५/१६)

According to *kṣīradadhi nyāya, rasa* from *āhāra rasa, rakta* from *rasa, mamsa* from *rakta, medas* from *mamsa, Asthi* from *medas, majjā* from *asthi & śukra* from *Majjā*, foetus from *śukra* are formed.

Organs producing śukra (शुक्रोत्पादक अवयव)

शुक्रवहस्रोतसां वृषणौ मूलं शेफश्च ।। (च.वि. ५/८)
शुक्रवहे द्वे शुक्रप्रादुर्भावाय द्वे विसर्गाय ।। (सु. शा. ९/७)

According to *Caraka* origin of *śukravaha* channels is from genitals & According to *Suśruta* there are four *śukravaha* channels, two for production of *śukra* & two for ejaculation of *śukra*.

तस्मान् मज्जस्तः यः स्नेहः शुक्रं संजायते ततः ।।
वाय्वाकाशादि भावैः शौषीर्यं जायतेस्थीषु ।
तेन स्रवति तत् शुक्रं नवोत्कुम्भादिवोदकं ।। (च.सि. १५/३५)

Majjā in presence of majja dhātvāgni gets digested, śukra gets formed from majjā. Due to the actions of *vāyu & ākāśa* mahābhūta, pores are formed in bone (*asthi*) & *śukra* oozes out from bone as the water oozes out from new earthern pot.

Ejaculation of semen (Śūkrapracyavana)

रस इक्षौ यथा दध्नी सर्पिस्तैलं तिले यथा । सर्वत्रानुगतं देहे शुक्रं संस्पर्शनेत्यथा ।।
तत् स्त्रीपुरुषसंयोगे चेष्टासंकल्पनात् । शुक्रं प्रच्यवते स्थानाज्जलमार्द्रात् पटादिव ।।
हर्षात्तर्षात् सरत्वाच्च पैच्छिल्याद्गौरवादपि । अणुप्रणवभावात् च द्रुतत्वन्मारुतस्य च ।।
अष्टाभ्य एभ्यो हेतुभ्यः शुक्रं देहात् प्रसिच्यते। चरतो विश्वरूपस्य रूपद्रव्यं यदुच्यते ।।
(च.चि.२/४-४६-४७)

As sugar cane juice in sugar cane, ghee in curds, oil in sessame seeds is present, in the same way *śukra* is present all over the body. During the time of cohabitation, when one has decided to have sex & physical contact with woman, the *śukra* oozes out of genitals as the water oozes from wet cloth on squeezing.

Erection, desire of females, inability, sliminess, heaviness, minuteness, liquidity & stimulation of *vāta* leads to ejaculation of semen. *śukra* is representative of *viśvātma,* who is present in all beings like man, animals, birds etc.

यथा मुकुलपुष्पस्य सु(स्व)गन्धो नोपलभ्यते । लभ्यते तद्विकाशात्तु क्षतया शुक्रं हि देहिनाम् ।।
नर्ते वै षोडशाद्वर्षात् सप्तत्याः परतो न च । आयुष्कामो नरः स्त्रीभिः संयोगं कर्तुमर्हति ।।
(च.चि.२/४/३९)

As fragrence from the bud can be made out only after blooming, in the same way *śukra* present in human body will be coming

out only after seventeen years, one who desires long life can indulge in sexual intercourse after 17 years & before 70 years.

Importance and uses of celibacy (ब्रह्मचर्य उपयोग एवं महत्व)

आहारस्य परं धामं शुक्रं तद् रक्ष्यमात्मनः । क्षयोह्यस्य बहून् रोगान् मरणं वा नियच्छति ।।
(च.नि.६/८-१०)

Food is ultimately transformed into *śukra,* so one should prevent the loss of *śukra*. Excessive loss of *sukra* leads to emaciation many diseases & even death.

शरीरं धार्यते नित्यमागारमिव धारणैः ।। (अ.सं.सू.)

It helps in sustaining of the body.

धर्म्यं यशस्यमायुष्यं लोकद्वयरसायनम् । अनुमोदामहे ब्रह्मचर्यमेकान्त निर्मलं ।। (अ.सं.सू. ७)

Celibacy gives success, longevity of life & rejuvenates both the worlds, it provides peace & purity.

ब्रह्मचर्यमायुष्याणां (च.सू. २५/४०)

Celibacy is one among the best enhancers of longevity. It is one among three pillars of life.

उपस्तम्भैः शरीरबलवर्णोपचयोपचितमनुवर्तते यावदायुः संस्कारात् संस्कारमहितमनुपसेवमानस्य य इहैवोपदेक्ष्यते ।। (च.सू. ११/३५)

Life endowed with strength, complexion & growth & continues untill the full span of life, provided person does not indudge in wrong activity.

ब्रह्मचर्यस्यायुक्तिरतिनभ्यासात् अतिमात्रेन्द्रियसंयमनादिरूपा सा हि मनक्षोभादि हेतुर्भवति ।।
(च.पा च.सू. ११/३५)

If one controls his *Indriyas* in excess, then he may suffer from mental suffering.

कायस्य तेजः परमं हि शुक्रमाहारसारादपि सारभूतम् । जितात्मना तत्परिरक्षणीयं ततो वपुः संततिरप्युदारा ।। (अ.सं.सू. ९/८४)

ब्रह्मचर्येण तपसा देव मृत्युमुपाघ्नतः ।। (वेद)

Gods attained immortality by *brahmacarya* & *tapas.*

आयुस्तेजो बलं वीर्यं प्रज्ञाधीश्च महायशः। पुण्यं च मनत्प्रयत्वं च प्राप्यते ब्रह्मचर्यया।।(वृद्धगौतम स्मृति)

Celibacy enhances longevity, lusture, strength, energy consciousness, intellect, success, good deeds, & attractiveness.

मरणं बिन्दुपातेन जीवनं बिन्दुधारणात् । यावत् बिन्दु स्थितो देहे तावत् कालमयं कुत ।। (हयोप्र)

Excessive loss of *śukra* (*bindu*) will lead to death & preservation of *śukra* leads to longevity of life. *śukra* is preserved in the

body, the body power is enhanced. *Śukra* is ultimate *teja* (lusture or fire) of the body, formed from essence of end product of food ie *Āhāra rasa*, so one having self control & desirous of having good progeny should protect his *śukra*.

One should observe strict celibacy or else if married practice sexual act according to season and rules mentioned in classics, only with his wife. Avoid it during inauspicious days, during morning & evening etc.

One should consume (*śāli*) Oryza sativa linn, Tritium aestivum (*Godhūma*), Phaseolus mungo linn (*māṣa*), hens egg, milk, meat, sugar & ghee which are having life giving & strength enhancing property for preservation & enhancing *vīrya*. Along with that food having sweet taste, unctous, heavy & strength giving food which help to preserve *vīrya*. Among regimens pleasentness of mind is best *vīrya* enhancer. क्षारं पुंस्त्वोपघातानां ।। (च.सू. २५/४०) one should avoid alkali as they destroy virility.

शुक्रवेगनिग्रहः षाण्ढ्यकराणां ।। (च.सू. २५/४०)

One should not with hold the urge of *śukra*, as it is non suppressible urge. It will lead to impotency, if one with holds the urge of *śukra*. So only in *Aṣṭāṅga saṅgraha*, *Abrahmacarya* has been described.

Preservation of Vīrya (वीर्यरक्षा)

प्रोक्तां मैथुनमष्टाङ्गं त्यजेत् ब्रह्मपरोथवा । ऋतुकालाभिगामि यात्स्वदारनिरतः सदा ।।
पर्ववर्ज व्रजेच्चैनां तत् व्रतो रतिकाम्यया ।। (मनु)

Observance of strict celibacy, if married sexual intercourse during *ṛtukāla* with only his wife is advised.

शुक्रलैर्जीवनीयैश्च बृंहणैर्बलवर्धनैः । क्षीरसंजननैश्चैव पयः सिद्धं पृथक् पृथक् ।
युक्तं गोधूम चूर्णेन सघृतक्षौद्र शर्कराम्। पर्यायेण प्रयोक्तव्यमिच्छता शुक्रमक्षयम् ।।
(च.सं.चि.२-३/६-७)

Milk prepared of *Śukrala*, *Jīvanīya*, *Bṛṁhaṇa*, *Balya* & *Kṣīrasañjanana* drugs separately helps to enhance *śukra*. Powder of wheat along with ghee, honey & sugar, if consumed prevents the depletion of *Śukra*.

Rice, wheat, black gram, hen's egg, milk, meat, chicken, sugar, ghee, sweet, unctous, heavy and nourishing preparations help to enhance *Śukra*.

Results of loss of Vīrya (वीर्यनाश फल)

दौर्बल्यं मुखशोषश्च पाण्डुत्वं सदनं श्रमः। क्लैब्यं शुक्राविसर्गश्च क्षीणशुक्रस्य लक्षणं।। (च.सू.१७/६९)

Weakness, dryness of mouth, anaemia, body ache, tiredness, impotency & absence of ejaculation on sexual intercourse are features of depletion of *śukra*.

शुक्रः भये मेढ्रवृषणवेदनाऽशक्तिमैथुने चिराद्वा प्रसेकः प्रसेके चाल्परक्तशुक्रदर्शनम्।।(सु.सू.१५/१३)

Pain in genitals, perinium, inability for sexual intercourse, delayed ejaculation, reduction in quantity are the features of depletion of *śukra*.

शुक्रस्य दोषात् क्लैब्यमहर्षणम् । रोगी वा क्लीबमल्पायुविरूपं वा प्रजायते ।।
न चास्य जायते पतति प्रस्रवत्यपि। शुक्रं हि दुष्टं सापत्यं सदारं बाधते नरम्।। (च.सू.२८/१८-१९)

Impotency, erectile disfunction, occurence of diseases, short life span & ugly look are produced in the progeny of person with vitiated *śukra*. Some times conception does not occur or results in abortion, if *śukra* is vitiated, which will effect both husband & wife & produce misery.

शुक्रे चिरात् प्रसिच्यते शुक्रं शीणितमेव वा तोदात्यर्थं वृषणयोर्मेढ्रं धूमयतीव च ।। (अ.हृ.)

Delayed ejaculation, ejaculation mixed with blood, pricking type of pain in genitals & fuming sensations are the features of *śukra* depletion.

Excessive sexual act ⟶ Depletion of *śukra* ⟶ sexual act ↓
No ejaculation
sexual act. ↓
vāta aggravate
enters blood vessel
Bleeding with ejaculation
↓
(सन्धिशिथिलता) Loseness of Joint ← Depletion of *śukra* & blood

(रूक्षता) Dryness
(दौर्बल्य) weakness
↓
(वातवृद्धि) *vāta* aggravation
Depletion of blood & flesh (मांसशोणितक्षय) ⟵ Drying of *kapha, pitta*

Kapha & *pitta* expulsion (श्लेष्मपित्त प्रच्यवन)
Pain in flanks (पार्श्वशूल)
Pain in scapular region (अंसावमर्द)
Horseness of voice (कण्ठोध्वंस)
Kapha in head (श्लेष्मपूरणशिर)
Body ache (अंगमर्द)
Inproper digestion(अविपाक) Opposite movement of vāyu (प्रतिलोम गति वायु)
Cough (कास)
Dyspnoea (श्वास)
Hoarseness of vice (स्वरभेद)
(राजयक्ष्म) Pthisis ← Rhinitis (प्रतिश्याय)
प्रतिलोमक्षय Spitting of blood (शोणितष्ठीवन)
weakness (दौर्बल्य)

Regimen during menstruation (स्त्रीऋतुचर्य)

Discussion of menstrual cycle in context of health preservation

मासेनोपचितं काले धमनीभ्यां तदार्तवम्। ईषत् कृष्णं विगन्धं च वायोर्योनिमुखं नयेत्।।(सु.शा.३/७)

The blood which is collected for one month, having blackish colour & specific odour is secreted from *dhamanis* (uterine actions & their endometrial capillaries) brought downwards to vagina for evacuation.

Normal menstruation

मासान्निष्पिच्छदाहार्ति पञ्चरात्रानुबन्धि च । नैवातिबहुल नात्यल्पमार्तवं शुद्धिमादिशेत् ।।
गुञ्जाफलसवर्णं च पद्मालक्तकसन्निभम् । इन्द्रगोपकसंकाशं आर्तवं शुद्धमादिशेत् ।।
(च.चि.३०/२२५-२२६)

The normal menstruation occurs once in a month for five days. The quantity is medium neither more nor less, devoid of sliminess, burning sensation & pain. The colour resembles fruit of *guñjā* (Abrus precatorius), red lotus flowers & *Indragopa* (an insect fire fly) is known as pure *ārtava*.

Regimens to be followed during menstruation (रजस्वला चर्या)

ततः पुष्पात् प्रभृति त्रिरात्रमासीत ब्रह्मचारिण्यधःशयिनी पाणिभ्यामन्नमजर्जरपात्रात् भुञ्जाना, न च काञ्चिन्मृजामापद्येत ततश्चतुर्थेऽहन्येनामुत्साद्य सशिरस्कं स्नापयित्वा शुक्लानि वासांस्याच्छादयेत् पुरुषं च । ततः शुक्लवाससौ स्रग्विणौ सुमनसावन्योऽन्यमभिकामौ संवसेयातां।। (च.शा.८/५)

Starting from first day of menstruation, she should observe celibacy (*brahmacarya*), sleep on the floor, she should take food in unbroken vessel & should not wash her body, on fourth day she should take head bath after oil massage, wear white cloth, garland of flowers & approach her husband with pleasent mind.

She should avoid day sleep, application of callyrium, shedding of tears, oil massage, bathing, anointing, cutting nails, fast running, laughing, fast winds & excessive exercise. She should sleep on bed made of grass on the ground, eat *haviśya* (preparation made of rice, ghee, milk). *Yāvaka* (preparation made of barley & milk), procedures like *Nasya* (nasal instillation), *svedana* (sudation) & *vamana* (emesis) are contra indicated during menstruation, she should think auspicious & good things. She should avoid pungent hot & salty substances.

Complications of improper regimens during menstruation

Contra indicated Regimen	*Complications in child*
Day sleep	Excessive sleep
Use of collyrium	Blindness
Weeping	Eye defects like squint
Bathing & anointing	Always sad
oil massage	skin diseases
cutting of nails	Abnormality of nails
Running	fickle minded
Laughing	Blackish colour of teeth, lips & tongue
Excessive talk	talkative
Excessive hearing	Deaf
Combing	Bald
Excessive exercise	Insane
use of *Nasya*	Menstrual disorders

Chapter- 14
PROPERTIES OF AIR & ITS IMPURITIES

Importance of air

विसर्गादानविक्षेपैः सोमसूर्यानिला यथा। धारयन्ति जगद्देहं कफपित्तानिलस्तथा।। (सु.सु.२१/८)

Sun, moon & wind together are responsible for different seasons in the universe, in the same way *Vāta, pitta & kapha* maintain the body.

Vitiated air (दूषित वायु)

विषौषधि पुष्पगन्धेन वायुनोपनीयते ना क्रम्यते .... कास श्वास वमथु प्रतिश्याय, शिरोरुग्ज्वरै-रूपतप्यन्ते ।। (सु.सू.६/१९)

Poison which is given in the form of flower (fragrant) produces cough, dyspnoea, vomiting, rhinitis, headache, fever etc.

तत्रवातमेव अनारोग्यकरं विद्यात् । तद्यथा ॠतु विषमम् अतिस्थिमितं अतिचलितं अतिपरुषं अतिशीतं अत्युष्णं अतिरूक्षं अत्यभिष्यन्दनं अतिभैरवारावमतिप्रतिहतं परस्पर गतिकुण्डलिनं असात्म्यगन्ध बाष्प सिकता पांशु धूमोपहतमिति ।। (च.वि. ३/७(१))

Climatic variations

Absence of characteristic features of particular *Ṛtu*.

- Excessive calmness (low pressure area created before the onset of cyclone).
- Violent blowing wind.
- Excessively dry, cold, hot, humid, fierce.
- Wind blowing from one direction colliding with wind blowing from other direction.
- Cyclonic wind.

Pollutants

Association with unwholesome smell, gases, sand, ashes, smoke etc. are not good for health.

Normal functions of air/wind

तद्यथा धरणी धारणं, ज्वलनोज्ज्वालनम्, आदित्यचन्द्रनक्षत्र ग्रहगणानां, सन्तानगतिविधानं, सृष्टिश्चमेघानां, अपां विसर्गः, प्रवर्तनं स्रोतसां फलपुष्पानां चाभिनिर्वर्तनं, उद्भेदनं चौद्भिदानां,

ऋतुनां प्रविभाग:, विभागो धातूनां, धातुमानसंस्थानव्यक्तिः बीजाभिसंस्कार:, शस्याभिवर्धनं विक्लेदोपशोषणे अवैकारिक विकारश्चेति ।। (च.सू. १२/८)

The following are the functions of air-sustenance of earth, kindling of fire, movement of sun, moon, stars & planets, creation of clouds, showering of rains, flowing of rivers, maturity of flowers & fruits, germination of seeds, development of plants, classification of seasons, five *mahābūtās*, bringing about dryness, hardness & transformation everywhere.

Effects of vitiated air on environment (प्रकुपित वायु)

प्रकुपितस्य खल्वस्य लोकेषु चरतः कर्माणीमानि भवन्ति । शिखरिशिखरावमथनम्, उन्मथनमनीकहानाम्, उत्पीडनं सागराणां, उद्वर्तनं सरसां, प्रतिसरणम् आपगानां, आकंपनं च भूमेः, आधमनं अम्बुदानां, नीहारनिह्लादपांशुसिकतामत्स्यभेकोरगक्षाररुधिराश्माश-निविसर्गव्यापादनं च वाण्णमृतूनां, शस्यानामसद्यातः, भूतानां चोपसर्गः, भावानां चात्रावकरणं, चतुर्युगान्तकराणां मेघसूर्यनलानिलानां विसर्गः, सहिभगवान् प्रभवाश्चमथश्च, भूतानाम् भावाभावकरः।। (च.सू. १२/८)

The following are aggravated functions of *Vāta*, breaking of peak of mountains, uprooting of trees, disturbing of ocean, overflowing of lakes, changing of course of rivers, bringing about earthquakes, causing thunders, storm, disturbance of six seasons, non productivity of plant, spread of epidemics among living beings, doing away with the positive features of creation, bringing about cloud, sun, fire & wind which would destroy all the four ages.

Effects of poisonous air (विषयुक्त वायु)

धूमेऽनिले वा विषसंप्रयुक्ते खगाः श्रमार्ताः प्रपतन्ति भूमौ । कास प्रतिश्यायशिरोरुजैश्च भवन्ति तीव्रा नयनामयाश्च । (सु.क.३/१६)

Air which is polluted with smoke & poison makes the birds tired & they fall over the earth. It also produces diseases like rhinitis, headache, acute eye diseases etc.

Effects of wind according to direction (दिशादिभेदेन वातगुणा)

पूर्वः सुमधुरः स्निग्धे लवणश्चैव मारुतः । गुरुर्विदाहजननो रक्तपित्ताभिवर्धनः ।।
क्षतानां विषजुष्ठानां व्रणिनः श्लेष्मिनाश्च ये । तैषामेव विशेषेण सदारोगविवर्धनः ।।
वातलानां प्रशस्तश्च श्रान्तानां कफशोषिणां ।। (सु.सु. २०/२३-२४)
तेषामेव विशेषेण व्रणक्लेदविवर्धनः ।। (डल्हण)

Eastern winds are sweet, unctous, salty, heavy, causes burning sensation & aggravates *Rakta pitta*. It is unwholesome for patients especially suffering from *Vṛṇa*, as it increases moisture (*Kleda*), poisoning & injury. It is *Kaphakara* & aggravates all diseases.

मधुरश्चाऽविदाही च कषायानुरसो लघुः । दक्षिणी मारुतः श्रेष्ठश्चक्षुष्यो बलवर्धनः ।।
रक्तपित्त प्रशमनो न च वातप्रकोपणः । (सु.सू.२०/२५)

Southern winds are sweet, astringent, not causing burning sensation and light. It is conducive to eyes, enhances strength, *Rakta pittahara* and does not aggravate *Vāta.*

विशदो रूक्ष परुषः खरः स्नेहबलापहः । पश्चिमो मारुतस्तीक्ष्णः कफमेदोविशोषणः ।।
सद्यः प्राणक्षयकरः शोषणस्तु शरीरिणां । (सु.सू.२०/२६)

Western winds are fast, dry, rough, reduce strength, unctousness, *Kapha, medas* and cause emaciation and take away the strength immediately.

उत्तरी मारुतः स्निग्धो मृदुर्मधुर एव च । कषायानुरसः शीतो दोषानां चाप्रकोपणः ।।
तस्माच्च प्रकृतिस्थानां क्लेदनो बलवर्धनः । क्षीणक्षय विषार्तानां विशेषेण तु पूजितः ।।
(सु.सू.२०/२७-२८)

Northern wind is unctous, soft, sweet, astringent, cold, does not vitiate *doṣas*, so only enhances strength, *kleda*, good for person suffering from emaciation *Kṣaya* & poison.

Purification of air (वायु शोधन)

लाक्षा हरिद्रातिविषाभयाब्दहरेणुकैलादलवल्क कुष्ठम् । प्रियङ्गुकाञ्चाष्टनिले निधाय धूमानिलौ चापि विशोधयेत् ।। (सु.क. ३/१७)

Ficus laccur (*lākṣa*), Termeric Curcuma longa (*Haridra*), Aconitum heterophyllum (*Ativiṣa*), Terminalia chebula (*harītaki*), Cyperus rotundus (*mustā*), Euletteria cardamomum (*ela*), Cinna momum tamāla (*valka*), Sassuria lappa (*kuṣṭha*) and *Priyaṅgu* are used in the form of fumes to purify air.

कर्पूरदेवदारुधूपचन्दनश्रीवाससर्जागुरुनिम्बसोमराजिकागन्धकगुग्गुलुराजिका-श्वेतसर्षपसकल्यादि हवन द्रव्याणामग्नौ हवनेन वायुविशुध्यति ।।

Cinnamomum kamphora (*Karpūra*), Cedrus deodara (*Devadāru*), (*Dhūpa*), Santalum indicum (*Candana*), *Śrīvāsa*, Shorea robusta (*Sarja*), Aquallaria agullacha (*Agaru*), Azadirachta indica (*Nimba*), Psoralia corilifolia (*Somarāji*), Sulphur (*Gandhaka*) & Commifera mukul (*Guggulu*) are used in *havana* i.e. sacrifice to purify the air.

To summerise the details wind is the factor responsible for seasonal changes, climate, movement of celestial bodies, germination etc. i.e. maintenance of the universe. Changes in the composition, direction & speed will lead to different hazards. In the ancient

times, even though there is no direct reference about air pollution, certain references like poisonous air (Su. Ka. 3/16) Ca. Vi. 3/7(i) can be related to air pollution & the diseases mentioned according to modern & in *Āyurveda* are similar.

Diseases produced due to poisoned air in Āyurveda	***Diseases produced due to air pollution***
Cough	Acute Bronchitis
Dyspnoea	Chronic lung disease
Vomiting	Acute respiratory infections in children
Rhinitis	Lung cancer, Bronchial asthma
Headache	Emphysema
Fever	Respiratory allergy, pneumonia
Acute eye diseases	Adverse effect of pregnancy
Unconsciousness	Cough, substantial discomfort

Air

Natural objectives of air

- Air is absolutely essential for maintenance of life.
- Exchange of gases by means of respiration.
- Regulation of body temparature.
- Sense of smell & hearing are transmitted through air.
- Necessity of air is relatively constant & is about 10-20 m^3/day.

Composition of Air

It is mixture of different gases, usual composition of air approximately is as given below–

Nitrogen – 78.1%
Oxygen – 20.93%
Carbon dioxide – 0.03%
} Major components

Argon
Neon
Krypton
Xenon
Helium
} Traces

Water vapour
traces of ammonia
suspended matter – dust, bacteria, spores, debris

Sources of Air pollution

1. Respiration–Respiration of men, animals & plants at night.

2. Combustion– Burning of gas, coal, oil, fuel etc.

3. Decomposition– Decomposition of organic matter

4. Automobile & Industries– Trade, traffic, manufacture process which produce dust, fumes, vapour & gases.

Natural purification

1. Wind– It dilutes and sweeps away impurities by its movement & does not allow accumulation of impurities.

2. Sunlight– Oxidises impurities & kills bacteria by temperature.

3. Rain– Cleanses by removing suspended & gaseous impurities.

4. Plants– Plants use carbon dioxide & produce oxygen during the act of photosynthesis.

Internal atmosphere

Human occupancy change the air with two aspects.

1. Physical changes 2. Chemical changes

Chemical changes

Carbon dioxide content gradually increases and oxygen decreases. On an average 0.7 cft CO_2 is given off at rest and 2 cft during exercise by a person. Average CO_2 out put is 0.6 cft/hr/person.

Physical changes

1. Increase of temperature– A person at rest emits 400 BTU/hr (British thermal unit) & during exertion it may go upto 4000 BTU. Thus leading to increase of temperature.

2. Increase of humidity– Moisture gets evaporated from skin and lungs. The occupied air contains 6% moisture.

Adult man – 700 gm water vapour/day
releases – 18.4 gm/hour during sleep
– 175 gm/hour – during vigorous work

3. Reduction in air movement– In crowded places air movement reduces.

4. Body odour– Sweat, mouth odour, scents, breath, unhygienic dress etc. produce bad odour.

5. Bacterial contamination– Person suffering from infectious diseases release pathogenic bacteria in to air.

Discomfort is a "subjective feeling which people experience in under ventilated and crowded rooms". It is mainly due to following physical changes in the room.

- temperature
- humidity
- air movement
- heat radiation

Measurements of thermal comfort

1. Air temperature 2. Air temperature & humidity

3. Cooling power– Air temperature, humidity & air movement considered together here. Measured by wet & dry Kata thermometer.

dry thermometer - 6 & above
wet thermometer - 20 & above

were considered as valves of thermal comfort.

4. Effective temperature– Arbitrary index which combines into single value the effect of temperature, humidity & movement of internal air on the sensation of warmth or cold felt by the human body.

5. Corrected effective temperature (CET)– CET scale deals with air temperature, velocity, humidity & mean radient heat globe thermometer, wet bulb temperature & air speed are considered.

6. McArdle's maximum allowable sweat rate– 4.5 litre/4hr- maximum allowable sweat the rate or predicted four hour sweat rate P_4SR.

Comfort levels

Range of CET over which majority of adults feel comfortable. There is no single opinion about comfort zone.

Comfort zone depends on physical, physiological & psychological factors. Comfort zones evaluated in India are as follows–

	°C CET in °F
1. Pleasant & cool	20°C (69°F)
2. Comfortable & cool	20-25°C (69-76°F)
2. Comfortable	25-27°C (77-80°F)
3. Hot & uncomfortable	27-28°C (81-82°F)
4. Extremely hot	28°C + (83°F +)
5. Intolerably hot	30°C + (86°F +)

	Predicted 4 hour sweat rate P4SR
1. Comfortable zone	1-3 lt
2. Just tolerable	3-4.5 lt
3. Intolerable	4.5 lt +

Modified from SPM K. Park.

Pollution of air

Pollution is an inescapable adverse effect of presence of man & his activities. Presence of substances (gases, mixture of gases & particulated matter) produced by activities of man in levels that are injurious for human health, safety or comfort or injurious for vegetation and other animals.

Sources of air pollution

1. Vehicles
2. Industries & factories
3. Household source
4. Others

Vehicles

Vehicles are the major sources of air pollution in the cities. They produce hydrocarbons, carbon monoxide, lead, nitrogen oxides & particulate matter.

- In strong sunlight some hydrocarbons & oxides of nitrogen are converted into 'photochemical' pollutants of oxidizing nature.
- Diesel engines which are not maintained properly, produce black smoke and malodorous fumes.

Industries & factories

- Large amount of pollutants to atmosphere are emitted by industries.
- Combustion of fuels emit heat & sulphur dioxide, nitrogen dioxide & fly ash.
- Smoke.
- Petrochemical industries produce hydrogen flouride, hydrochloric and organic halides which are hazardous for health.
- Carbon monoxide, Carbon dioxide, Ozone, Hydrogen sulphide & sulphur dioxide are emitted by industries.
- Chimneys dispose waste at high temperature & high speed.

House hold sources

- Combustion of coal, wood, gas and oil produce smoke, dust, sulphur dioxide and nitrogen oxides.
- Smoking also can be considered under air pollution.

Others

Burning refuse, incinerators, pesticide spraying, natural sources (Eg: wind born dust, fungi, mould, bacteria) & nuclear energy programmes are also included under air pollution.

Air Pollutants

More than100 substances have been identified as air pollutants.

Important pollutants– Carbon monoxide, carbon dioxide, hydrogen sulphide, sulphur dioxide, sulphur trioxide, nitrogen dioxide, fluorine compound, organic compounds like hydrocarbons, aldehydes, ketones, organic acids, metalic contaminents like arsenic, zinc, iron resorting from smelting, radio active compounds & photochemical oxidants (Ozone)

Others– Asbestos, beryllium, mercury, benzene, fluorides, vinyl chloride, lead & radiation.

Classification of pollutants

1. Based on Physical Nautre–
   - Solids
   - Liquids (vapour)
   - Gases
2. Based on Chemical Nauture–
   - Gases
   - Organic compounds
   - Metalic compounds
   - Radio active compounds
   - Photochemical oxidants
   - Others
3. Based on mode of pollution–
   - Indoor pollutants
   - Outdoor pollutants

Indoor pollutants

Sources	*Pollutants*
Tobacco smoke, Stove, Aerosol sprays	Respirable particles
Combustion equipments, stove, gas heaters	Carbon monoxide
Gas cookers, cigarettes	Nitrogen dioxide

Sources	*Pollutants*
Coal combustion	Sulphur dioxide
Combustion, respiration	Carbon dioxide
Particle board, carpet adhesives, insulations	Farmaldehyde
Electric arching, UV rays	Ozone
Insulation, fire proofing	Asbestos

Curtecy SPM K. Park.

Diseases– Acute respiratory infections in children, chronic lung diseases, cancer in adults, adverse pregnancy out comes & pneumonia are different diseases produced by air pollution.

Adverse effects of air pollution–

About 1-3 billion urban residents are subject for air pollution.

- Health aspects.
- Social & economic aspects.

Health aspects
- Immediate effects
  - Acute bronchitis
  - death by suffocation
- Delayed effects
  - Chronic bronchitis, lung cancer
  - Bronchial asthma
  - Emphysema
  - Respiratory allergy

Major air pollutants, their sources & adverse effects.

Pollutant	*Sources*	*Effects*
1. Oxides of Nitrogen	Automobile exhaust, gas stoves, heater, wood burning stoves, kerosene space heater	Respiratory tract irritation, Bronchial hypersensitivity, impaired lung defence, bronchiolitis obliterance
2. Hydro-carbons	Automobile exhaust, cigaratte smoke	Lung cancer
3. Ozone	Automobile exhaust, high altitude aircraft cabins.	Cough, substernal discomfort, broncho constriction, decreased exercise ability, respiratory tract irritation.

Ozone, Polynuclear aromatic hydrocarbo

Pollutant	*Sources*	*Effects*
4. Sulphur dioxide	Power plants, smelters, oil refineries, kerosene space heaters.	Exacerbation of asthma, COPD, respiratory tract irritation, death in severe exposure.
5. Lead	Automobile exhaust using leaded gasoline.	Impaired neuro psychological development in children, Haematological effects.

Source : Park SPM.

Assessment of air pollution

Sulphur dioxide, smoke & suspended particles are sensitive indicators. These are observed on daily basis at several places & results will be collected by central agency.

1. Sulphur dioxide– Concentration is evaluated in all air pollution survey.

2. Smoke or soiling index– Air is filtered through filter paper & the stain is measured by photo electric meter. It is expressed in terms of microgram/cubic meter.

3. Grit & dust measurement– Deposit gauges collect grit dust & other solids & are analyzed monthly.

4. Coefficient of haze– A factor used, particularly in USA to assess the amount of smoke or other aerosols in air.

5. Air pollution index– Arbitrary index takes into account one or more pollutants as a measure of severity of air pollution.

10 times sulphur dioxide concentration plus twice the carbon monoxide concentration plus twice the coefficient of haze considered as "cause for alarm" in USA.

Guide lines for individual substances based on effects other than cancer or odour/annoyance (Source SPM Park).

Substance	*Time weighted average*	*Averaging time*
1. Cadmium	1-5 ng/m^3 10-20 ng/m^3	1 year (rural) 1 year (urban)
2. Carbon disulphide	100 μg/m^3	24 hours

Smog → Smoke + fog.

Acid rain -> $SO_2 + NO_2$. Ozone deplet? -> CFC

Substance	*Time weighted average*	*Averaging time*
3. Carbon monoxide	100 mg/m^3	15 minutes
	60 mg/m^3	30 minutes
	30 mg/m^3	1 hour
	10 mg/m^3	8 hour
4. 1,2 Dichloro ethane	0.7 mg/m^3	24 hour
5. Dichloromethane	3 mg/m^3	24 hour
6. Formaldehyde	100 μg/m^3	30 minutes
7. Hydrogen sulphide	150 μg/m^3	24 hours
8. Lead	0.5-1 μg/m^3	1 year
9. Manganese	1 μg/m^3	1 year
10. Mercury	1 μg/m^3 (indoor air)	1 year
11. Nitrogen dioxide	400 μg/m^3	1 hour
	150 μg/m^3	24 hour
12. Ozone	150-200 μg/m^3	1 hour
	100-120 μg/m^3	8 hour
13. Styrene	800 μg/m^3	24 hours
14. Sulphur dioxide	500 μg/m^3	10 minutes
	350 μg/m^3	1 hour
15. Tetrachloro ethylene	5 mg/m^3	24 hours
16. Toluene	8 mg/m^3	24 hours
17. Trichloro ethylene	1 mg/m^3	24 hours
18. Vanadium	1 μg/m^3	24 hours

Prevention & control of air pollution

1. Prevention of escape of toxic substances into surrounding air- by techniques like enclosure, ventilation, air cleansing & "Arresters" for removal of contaminants.

2. Replacement– Increased use of electricity, gas, central heating in place of coal heating reduces smoke & use of deleaded petrolium.

3. Dilution– It is useful when pollutants are in the range of self cleansing mechanism of environment. Green belts in area between industrial and residential area act as diluters.

4. Measures to reduce vehicular pollution– Use of four stroke engines, as they release less partially burnt fuel into the environment.

Use of lead free petrol– Usually Tetra ethyl lead is used to enhance the level of octane in the fuel, which prevent the damage due to knocking and enhance the efficiency of engines.

Use of catalytic converters, this device is fitted near the tail pipe of vehicle, to covert the abnoxious emissions released from system to harmless byproducts.

Use of CNG (compressed natural gas) as fuel instead of petrol or diesel, which is almost pollution free.

5. Government action and Legislation– Clean air acts.

- Increasing height of chimney
- Power of local authorities to carry out investigation.
- Standard of quality of air will be considered.

In India the air (prevention & control of pollution) Act-1981 & National air quality monitoring programe sponsored by Central Pollution Control Board (CPCB) helps in monitoring air quality.

International Action

Prevention of Air pollution on world wide is promoted by WHO by seting up laboratories. Centres are present in London, Washington, Moscow, Nagpur, Tokyo & 20 laboratories in different places.

Purification measures for air

1. Mechanical ventilation
2. Ultraviolet radiation
3. Chemical mists
4. Dust control

1. Mechanical ventilation– It expels out vitiated air & bacterial density.

2. U.V. radiation– It is effective in disinfection of OT & infectious disease wards.

3. Chemical mists– Tri-ethelene glucol vapours are effective bacteriocidal against droplet nuclei & dust.

4. Dust control– Application of oil to floor to reduce bacterial count in air.

Composition of Mountain air (पर्वतीय वायु)

High Altitude

- The air pressure decreases as we go higher above the sea level. At about 1,00,000 ft above sea level, it reduces to about 10 mm Hg from 760 mm Hg.
- Air becomes less dense.
- Concentration of oxygen reduces.
- At altitude of 25000 ft, man cannot survive without breathing equipment.
- Concentration of oxygen & other gases is less.
- Ozone may be present.
- Moisture is less.
- Effect of UV rays is more.

Effects on health

1. Acute mountain sickness
2. High altitude pulmonary oedema.

Acute mountain sickness

Relatively common, harmless and transient condition.

Clinical features

Headache, nausia, breathlessness, insomnia, vomiting and impaired vision are produced due to hypoxia. Hormonal disturbance in the body also occurs.

High altitude pulmonary oedema

Symptoms appear generally by third day. It is difficult to differentiate from ordinary mountain sickness. Pulmonary oedema, cough, cheyne stoke breathing, oliguria, mental confusion, hallucinations, stupor, siezures, coma and condition does not respond to antibiotics. Condition is rare below 12000ft.

Ventilation

Ventilation is the "science of maintaining atmospheric conditions in the buildings, which are comfortable and healthy for human body".

- Internal ventilation
- External ventilation

Internal– Removal or dilution of the air which has been stagnent, warm and moist through vitiating process, by air which is comparatively fresh and in motion.

External– In order to admit fresh air inside the external air should be pollution free.

Standards of ventilation

1. Cubic space required– Minimal fresh air range is 300-3000C ft/hour/person. Carbon dioxide content should not be more than two parts in 10000 parts of air & it gives fresh feeling. Person expires on an average 0.6 C ft/hour of Carbon dioxide.

2. Number of air changes– The studies have shown that Carbon dioxide over 5% & Oxygen less than 18%, does not have deleterious effect on health. So long as "cooling power" of air is satisfactory. In living room 2-3 air changes/hour and in assemblies 4-6 air changes/hour are recommended. Space of 1000-1200 ft/person is sufficient.

3. Floor area– It is more important than cubic space. 50-100 sq. ft/person is optimum.

4. Amount of fresh air required for artificial light–

Candles
Kerosene oil lamps
Coal gas burners
Electric lights are ideal
} 2000 & 2250 C ft/hour

5. Amount of fresh air for sick– Average– 3750 Cft/hour

Types of Ventilation

1. Natural – Perflation } Wind
   – Aspiration } Wind
   – Diffusion
   – Inequality of temparature
2. Artificial/mechanical – Exhaust/vacuum
   – Plenum/propulsion
   – Balanced/combined
   – Air conditioning

Natural ventilation

Natural ventilation is simplest system of ventilating small dwellings, schools and offices.

Air current or wind

Winds are very powerful ventilating agents which act by two ways.

1. Perflation 2. Aspiration

Perflation– Air in motion forcing through openings in the room ie windows, doors etc, which result in natural currents of air is known as perflation. **Cross ventilation** encourages perflation, and are considered ideal, construction of back to back houses discourages it.

Aspiration– Suction action of the air, due to partial vacuum created by some obstruction as in case of chimneys near burning places.

Diffusion

Air passes through minute openings or spaces by diffusion. This is very slow process.

Difference in temperature

Air blows from high density to low density. It moves up when it is heated and goes out through openings provided high up in the room. The dense and cool air enters from openings provided below. Velocity of air is more if the difference in temperature between inside and out side is greater.

Advantages

1. Cheapest source 2. No need of machines and electricity.

Disadvantage

Velocity, temperature & humidity of air cannot be modified.

Mechanical/Artificial Ventilation

1. Exhaust/vaccum ventilation

Exhaust fans driven by electricity take vitiated air out. It consists of suction ducts communicating with main shaft & motor power derived from electric exhaust fan/propeller fan. Especially used in factories to take away dangerous fumes and dusts.It is also used in coal mines, kitchen, theatres, public halls, hospitals etc.

Disadvantages

It is not possible to heat or cool the incoming air. Extraction of air throughout the rooms is not uniform, rooms near upcast shaft have air extracted well, those at distance are not extracted well.

2. Plenum/propulsion ventilation

In this system the air is forced into a room by artificial measures like centrifugal fans, blower steam heated coils, forming steam jets and other instruments.

Air is forced under pressure into the room. So all doors and windows should be kept closed. Device is kept in central chamber. Air is washed by passing through water screen or filtered through filter. The air can be warmed, cooled or humidified according to the seasons. Air is introduced at low level near floor breathing line bathed with fresh air.

Advantages

1. Incoming air can be controlled with respect to level, rate, temperature and humidity.

2. In cold weather air can be heated through heated pipe, during hot weather air can be cooled and humidified through cold sprays.

3. Air is filtered, so that it is free form dust.

4. This ventilation is ideal for printing process, factories and public halls.

Reference of *Dhārā gṛha* ie the home equipped with artificial fountains to cool the hot *grīṣma ṛtu* is found in our classics, similar methods are described in the management of *pitta* disorders.

3. Balanced or combined ventilation

The most ideal method, where combination of plenum & exhaust ventilation are used. It is even used in airconditioning, where conditioned air is driven into the room by means of ducts with respect to temperature and humidity.

Warmed fresh air is delivered at height of 7 ft from floor by plenum method. All outlets are connected with upcast shaft, where propulsion is done with the help of fan. There should be no leakage through windows or doors for the best effects.

4. Air conditioning

It is defined as simultaneous control of velocity, temperature of air & humidity inside affecting both physical & chemical conditions of atmosphere inside any room. Factors like dust, bacteria, odours & toxic gases, which affect the human health & comfort are also included.

Air is first filtered & then saturated with water vapour. Excess of moisture is removed & heated or cooled to desirable temperature. Difference between outside air & conditioned air inside should not be more than 20°C.

Otherwise it gives the feeling of discomfort. Generally difference is between 10°F-15°F.

Transition rooms– Some times they are provided with transition rooms, which help the people to get adjusted.

Heating of rooms

- Conduction
- Radiation
- Convention

} Heat is obtained by three principles

Methods →
- → Open fire places– wood/charcoal/coal.
- → Closed fire/stoves
- → Heating by hot air/hot water/steam
- → Electric fire/radiators
- → Panel heating

Concept of artificial heating is in practice since ancient times. In our ancient classics we find reference of it in *Ṛtucarya, Vāta upakrama* & many other contexts.

.... भूमिगर्भगृहाणि च । साङ्गारायानां शय्यां च कुथकम्बलसंस्कृताम् ।। (अ.सं.सू.४/१७)

The under ground homes, room heated with coal, bed with thick blankets & woolen blankets are used during cold seasons for heating.

Jentāka variety of sudation can be taken as modification of central heating system in the ancient times.

(1) Open fire

Wood, charcoal & coal are used for this purpose.

Advantages– It looks attractive.

Disadvantages

1. Produces smoke & causes of atmospheric pollution.
2. Heating of room is unequal.
3. Heat is unequal, alternately becomes bright & dull.
4. Periodic replacement of fuel is necessary.

(2) Closed fire/stoves

Cast iron stoves filled with coal, coke & kerosine are used for the purpose of heating.

Advantage– Gives uniform heat as it gives heat by convention.

Disadvantages– (1) Not efficient compared to open fire
(2) It dries the air
(3) Looks less cheerful.

(3) Heating by hot air/hot water/steam

- Mechanical methods are adopted to heat the air.
- Hot water or steam is utilised for warming building.
- It is circulated from main source to other parts of building.
- It is known as central heating.

(4) Electric heaters/Radiators

Heat is produced by radiation.

Advantages– It is clean, easily for use & without impurities.

Disadvantages– 1. It is expensive device 2. Dries the air

(5) Panel heating system

Heating units are kept inside during construction of houses in the floors, wall & ceilings.

Advantages– Uniform distribution of heat is present and ideal for schools, hospitals & public places.

Disadvantage– They are costly.

Artificial cooling – • closed the windows & doors (prevent the entry of sunrays)
Use blue colour curtens, use of fans, Use of tattis / chicks, uses of Khus - Khus a screen prepare

Chapter- 15

LAND AND RESIDENTIAL PLACE

मनसश्चक्षुषो यत्र सन्तोषो जायते भुवि । तयां कार्य गृहं सर्वैरिति गर्गादिसम्मतम् ।। (गृहभूषण)

Land which is pleasing for eyes & mind is ideal for construction of house.

Land fit for construction of houses

(वास्तुशास्त्रोक्त ग्राह्यभूमि)

देवानां तु द्विजातीनां चतुरस्त्रायता श्रुता । वास्त्वाकृतिरनिन्द्या सावाक्यत्यक्दिक्समुन्नता ।।
ह्येमवेणुवीणाब्धिदुन्दुभिध्वनिसंयुता । पुन्नागजातिपुष्पाब्जधान्यपाटल गन्धकैः ।।
पशु गन्ध्यसमा श्रेष्ठा सर्वबीजप्ररोहिणी । एक वर्णा घना स्निग्धा सुखसंस्पर्शनान्विता ।।
बिल्वो निम्बश्च निर्गुण्डी पिण्डितः सप्तपर्णकः । सहकारश्च षड्वृक्षैरारूढा या समस्थला ।।
निष्कपाला निरुपला कृमिवल्मीकवर्जिता । अस्थिवर्ज्या न सुशिरा तनुवालुक संयुता ।।
अङ्गारैर्वृक्षमूलैश्च शूलैश्चापि पृथग्विधैः । पङ्कसंकरकूपैश्च दारुभिर्लोष्ठकैरपि ।।
शर्कराभिरयुक्ता याभस्माद्यैस्तु तुरपि । सा शुभा सर्ववर्णानां सर्वसंपत्करी धरा ।।
दध्याज्यमधुगन्धा च तैलासृग्गन्धिका च या । श्वेतासृकूपीत कृष्णा हयगजनिनदा षड्साचैकवर्णा ।।
गोधान्यांभोजगन्धोपलतुषरहिताऽवाक्प्रतीच्युन्नता या ।
पूर्वोदग्वारिसारा वरसुरभिसमा शूलहीनास्थिवर्ज्या ।।
सा भूमिः सर्वयोग्या कणदररहिता सम्मताद्यैर्मुनीन्द्रैः ।। (मयमते ३/)
श्वेतारक्तकपीतकृष्णवसुधा स्वादुः कटुस्तिक्तकाः । कषायघृतशोणितान्नमदिरागन्धाः शुभा विप्रतः ।।
(मुहूर्तमार्ताण्ड)

Land for the temples & houses for *brahmins* should be square, elevated & in south-west direction.

Smell of horse, elephant, bamboo, water store, *Nāgakeśara, Mallika, Dhānya, Pāṭala* in the land is good.

Land with good smell, plane land, which is fertile, so that seeds germinate fast, dark coloured, unctous & soft to touch is good for construction of houses.

Trees of *Bilva, Nimba, Nirguṇdi, Saptaparṇa, Āmra & Vibhītaki* should be grown near by, land should be plane without big pieces of mud pot, stones, insects, bones, sand, coal, roots of plants, spines, manuer pits, small wood pieces & big gravels, ash & yellow colour.

Land with smell of curd, ghee, honey, oil, blood, cow & lotus & white, red, yellow and black colour, sound of elephants & horse

& having 6 *rasa*, single coloured, devoid of stones, saw dust etc., spines, bones, crevices and elevated in south eastern direction are the ideal land for construction of houses.

Earth of white, red, yellow, black colour, sweet, pungent, astringent & bitter taste, smell of ghee, blood, rice & wine are auspicious.

Land unfit for construction of houses (अग्राह्य भूमि)

शवमीनपक्षिगन्धा या सा धरा निन्दिता वरैः । सभा चैत्य समीपस्था नृपमन्दिर संश्रिता ।।
देवालय समीपस्था कण्टकीद्रुमसंयुता । वृत्त त्रिकोण विषमा वज्राभा कच्छपोन्नता ।।
चण्डालवासगच्छाया चर्मकारालायश्रिता ।। (म.म.३/)

- Land having smell of dead body, fish and birds is not good.
- Land near *Caitya vṛkṣa* (holy tree), king's palace, public halls, temple and spiny plants is unfit for construction of houses.
- Land which is round, triangular, irregular, very hard like diamond, elevated like tortoise, situated near house of *cāṇḍāla*, shadowed and leather processing unit near by is unfit.

Features of Vitiated Land

देशं पुनः प्रकृतिविकृतिवर्णगन्धरसस्पर्श क्लेदबहुलमुपसृष्टं सरीसृपव्यालमशकशलाभमक्षिका मूषकोलूक श्माशानिक शकुनजंभूकादिभिः, तृणोलूपोपवनमत्रं प्रतानादि बहुलमपूर्ववदवपतित शुष्कनष्टसस्यं धूम्रपवनं प्रध्मातपतत्रिगणमुत्कृष्ट श्वगणमुद्भ्रान्त व्यथित विविध मृगपक्षिसंघामुत्सृष्टं नष्ट धर्मसत्यलज्जाचार शीलगुणजनपदं शश्वत् क्षुभितोदीर्ण सलिलाशयं प्रततोल्का पातनिर्घात भूमि कम्पमति भयारावरूपं रूक्षताम्रारुण असिताभ्रजाल संवृतार्क चन्द्रताराकमभीक्ष्णं ससंभ्रमोद्वेग इव सत्रसरुदितमिव सतमस्कमिव गुह्यकाचरितमिवा क्रंदित शब्द बहुलं चाहितं विद्यात् ।। (च.वि. ३/७ (३))

Purification of land (भूमिशोधन)

भूशुद्धिर्मार्जनाद्दाहात्कालात् गोक्रमणात् तथा । सेकादुल्लेखनाल्लेपात् गृहं मार्जन लेपनात् ।।
(या.व.)

Cleaning (sweeping), burning, by standing, grazing of cows, sprinkling of water (disinfectants), scraping & covering land can be purified. House can be purified by wiping, washing & white washing.

House (निवास स्थान)

Foundation (भित्तिमूल)

पूर्वपश्चिमतो दैर्घ्यं सपादं दक्षिणोत्तरम् । शुभावहं गृहं चोर्ध्वं सूर्यविध्दं न सौख्यदं ।। (गृ.भू.)

It should be built, so that breadth wise it is in east & west direction, length wise it should be in north & south direction. Direct entry of sun rays is not good for health.

Platform (उपपीठ)

अधिष्ठानस्य चाधस्तात् उपपीठं प्रयोजयेत्। रक्षार्थमुन्नतार्थच्च शोभार्थं तत् प्रचक्षते।।(म.म.१३/)

Above the foundation, there is an elevation meant for protection, beautifying, elavating the building called as *Upapītha* i.e. platform.

Bhitti or walls–The walls should be strong, devoid of crevices

Gṛha vitāna or roof. It is of two types.

1. Samatata – Uniform 2. *Nimnaga*– sloping

The roof should be so that the rain water drains easily & does not leak.

Kitchen (महानसम्)

भोजनगृहं प्रस्त्रावबर्चोगृहयोः सन्निहिते न निर्माप्यम्। तथैवं प्रबन्धः कार्यो यथा धूमः सर्व गृहेषु न प्रसरेत् ।।
धूमनिर्गमनार्थ महानसवितानेऽनेके छिद्राः कार्याः । आग्नेय्यां दिशिकर्तव्यामावासल्य महानसम् ।।
गवाक्षजालमार्गाढ्यमर्धमित्सुपलेपितम् । चुल्ली तत्र प्रकर्तव्या पूर्वपश्चिममायता ।। (क्षे.कु.)

Latrines & bathrooms should not be near kitchen, smoke should not spread inside the house, holes should be made in the roof of kitchen for the escape of smoke. Kitchen should be in south east direction. It should have door of mesh, half should be covered with impermeable material like cement. Stove should be kept in east west direction (breadth wise).

Other rooms (अन्यानिगृहाणि)

स्नानादिपाकशयनास्त्रभुजे च धान्य । भण्डारदेवतगृहा दिशि पर्वतः स्युः ।।
तन्मध्यतस्तु मथनाज्यपुरीषविद्याभ्यास आख्यरोदनरतौषधसर्वधाम ।। (गृ.भू.)

Other rooms for bathing, cooking, sleeping, eating, storing grains, room for goods, churning, preparing ghee, studying, keeping medicines etc. should be built accordingly.

Room for parturient mother (सूतिकागारम्)

अरिष्ट ब्राह्मणक्षत्रियवैश्यशूद्राणां श्वेतरक्तपीतकृष्णेषु भूमि प्रदेशेषु बिल्वन्यग्रोधतिन्दुकभल्लातक निर्मित सर्वागारं यथा संख्यं तन्मय पर्यंङमुपलिप्तभित्तिं सुविभक्तं परिच्छादं प्राग्द्वारं दक्षिणद्वारं वाष्टहस्तायतं चतुर्हस्त विस्तृतं रक्षामङ्गल सम्पन्नं विधेयम् ।। (सु.शा.१०/७)

Land having white, red, yellow and black colour should be used for *Brahmaṇa, Kṣatriya, Vaiṣya & Śūdra*, wood of *Bilva, Vaṭa, Tinduka & Bhallātaka* should be used respectively. Walls should be plastered with white colour (lime). All the things should be placed in an organised way. Door should be in eastern or southern direction. Labour room should have *8 hasta* length, *4 hasta* breadth. All auspicious things should be kept in it.

Room for children *(कुमारागार)*–

वास्तु विद्याकुशलः प्रशस्तं रम्यमतस्कं निवातं प्रवातैकदेशं दृढमपगतश्वापदशुदंष्ट्रमूषिकपतंगं सुसंविभक्त सलिलोदूखल मूत्रवर्चःस्थानस्नानभूमिमहानसमृतुसुखं यथार्तुशयनासनास्तरण संपन्नं कुर्यात्तथा सुविहितरक्षाविधान बलिमंगलहोम प्रायश्चित्तं शुचिर्वृद्धविद्यानुरक्तजल संपूर्णमिति कुमारागारविधिः ।। (च.शा.अ.८/५९)

An expert architect should build ideal, beautiful and strong room for children devoid of darkness, harsh winds, where animals like dog, fox, cruel animals, rats, spider etc. insects are not present. It should be constructed separately & place for storing water, *udū khala*, urination, defecation, taking bath and cooking should be provided.

House should be so that, it is comfortable in all seasons & bed should be made according to seasons. Equipped with chairs, beds, toys etc. Measures for protection of child should be taken by performing protective measures like sacrifice, oblations, etc. Place should be kept clean and elders, doctors, persons who take care of children should be present.

Cattle shed & Horse stable *(गोशाला & अश्वशाला)*–

1. They should not be very near to the house as the dung, urine etc. pollute the soil & produce many disease to the residents.

2. Atleast it should be 100 ft. away from the house.

3. About 15 ft. space should be left free around this.

4. Height should be atleast 12 ft.

5. Space for one cow 12 ft. length & 4 ft breadth. Space for one horse 12 ft. length & 6 ft. breadth.

6. Platform should be constructed for the animals 1 ft. above the ground with bricks, cement etc.

7. Drainage should be made for the disposal of urine & dung of animal to the outside.

8. A ditch should be dug out side for the disposal of waste atleast 10 ft. away from the shed.

9. This should be disposed away periodically to far off place away from the village.

10. Shed should have good ventilation as well as lighting facility.

11. Roof should protect the animals from rains and intense sunlight.

12. Always it should be maintained clear. It should be cleaned twice daily.

13. Dung should always be put into the pit out side.

14. Saw dust should be prepared away from this stable. It should not be kept in stable for more than 4 days.

15. Clean water should be provided for the animals.

Housing

Housing includes both physical structure providing shelter, surrounding community services & facilities. According to WHO residential environment is defined as physical structure that man uses & environments of the structure including all necessary services, facilities, equipments & devices needed for physical, mental health & social well being of family & individual.

Purpose of housing

- It gives sanitary shelter & protection.
- It gives space for family life activities.
- There should be easy access to community facility.
- It is a form of investment which shows economic stability.

Housing standards in India (by EHC)- 1947

- Site selection
- Set back
- Flooring
- Thickness of walls
- Height of roof
- Number of rooms
- Floor area
- Cubic space
- Window area
- Lighting standards.
- Kitchen
- Latrines
- Disposal of garbage & refuse
- Facility for bathing & washing
- Sanitary water supply

Selection of Site

It should be at higher level than its surroundings, so that it is not subject to flooding during rains. Independent access to street, of adequate width should be present. It should be away from breeding places of mosquitoes & flies. It should also be far away from dust, smoke, excess of noise & traffic. It should have pleasent surroundings. The place should be dry & free from night soil.

Set back

Open space around the house is called as set back.

Rural area– built up area 1/3rd the total area.

Urban area– built up area upto 2/3rd of total area.

There should not be any obstruction for lighting & ventilation.

Flooring

Pucca floor

- It should be impermeable, clean & dry, so that washing process is easy.
- It should be smooth, without cracks to prevent breeding of insects & dust. It should be damp proof.
- The plinth should be 2-3 feet.

Thickness of walls

The walls should be reasonably strong and should not absorb or conduct heat, simultaneously the walls should be weather resistant and unsuitable for rats & rodants & smooth. Walls should be atleast 9 inch thick and cream or white colour.

Height of roof

It should not be less than 10 feet, so that heat transmission is low.

Rooms

There should be minimum 2 living rooms. Number & area should be increased according to family size.

Floor area

- At least 120 sq. ft. area is required for more than one person.
- At least 100 sq. ft. area is needed for one person.
- In living room, the space should not be less than 50 sq. ft./ person & optimum is 100 sq. ft area.

Cubic space

Unless mechanical ventilation, the air space of about 500C ft/ person, preferably 1000C ft./person is necessary.

Window area

- In absence of mechanical ventilation & artificial lighting, 2 windows should be present, one opens directly to outside space. Windows should not be more than 3 ft above groundlevel & window area should be 1/5 the floor area.

- windows & doors form $2/5^{th}$ the floor area.

Standards of lighting

The day light factor must be more than 1% over half the floor area.

Kitchen

The house should be provided with separate kitchen devoid of dust & smoke. Presence of adequate light & ventilation with arrangement for storing food, fuel, provision & water supply is required. The site for cleaning vessels & proper drainage of water is necessary.

Latrine

Similarly latrine is a must, with water carriage system.

Disposal of garbage & refuse

Removed from dwelling every day and disposed in sanitary manner.

Facility of bathing & washing– Bath rooms with drainage facility is necessary.

Sanitary water supply

Safe and adequate water supply should be present always.

Standards of rural housing

- At least 2 living rooms, ample of verandah are essential.
- Built up area should not be more than $^1/_3$rd of total area.
- Separate kitchen provided with sink & platform should be present.
- House should have a sanitary laterine.
- Windows should comprise of atleast 10% of the floor area.
- Sanitary or tube well should be present with in quarter mile from the house.
- Cattle sheds should be at least 25 ft away from houses. Shed should be open at all sides with area 8 ft. x 4 ft/cattle.
- Good arrangement for disposal of garbage & waste should be made.

Effect of housing on Health

Respiratory infections, skin infections, rat infection, arthropods, accidents lead to morbidity & mortality in substandard houses. It also has psychological effects.

Disadvantages of over crowding

- It interferes with movement, privacy, hygiene, proper rest and sleep of the residents.
- Infectious disease spread rapidly
- Irritability, anxiety, violence and mental disorders aggravate.

Accepted standards

1 room – 2 persons
2 room – 3 persons
3 room – 5 persons
4 room – 7 persons
5 room – 10 person, additional 2 for each room
– Baby under 12 month not counted
– 1 yr child counted as 1/2 unit

Various Indicators of housing

1. Physical indicators– Floor space, cubic space, room height, persons per room, rooms, per dwelling, light, water, ventilator etc.

2. Economic indicators– Cost of building, rental levels, taxes, and expenditure on house.

3. Social indicators– (a) Indicators of prevention of illness.

Government policy

- A separate ministry of works & housing was created at the centre in 1952.
- Housing programmes → Public sector housing → for Govt servants
  → Social housing schemes low & middle income groups
- **For the proper functioning–** Statutary Housing Boards at state level, National Building Organization (NBO), National Building Constructor Corporation (NBCC), Housing & Urban Development Corporation (HUDCO) & Hindustan Housing Factory are helping.
- 8th five year plan adopted National housing policy. Minimum needs programme under the state concentrate on rural house program in 7th plan. Provision of free sites, assistance in building houses depending on category, subsidy & loan are provided under MNP.
- Indira Awas Yojana was started in 1985-86.
-

Chapter- 16
WATER

Definition (निरुक्ति)

पानीयमन्तरीक्षमनिर्देशरसममृतं जीवनं तर्पणं धारणमाश्वासजननं श्रमक्लमपिपासामदमूर्छातन्द्रा निद्रादाहप्रशमनमेकान्ततः पथ्यतमञ्च ।। (सु.सू. ४५/३)

जीवनं प्राणधारणं, सौम्यधातुवृद्धिकरं, ओजोवृद्धिकरं तर्पणं तृप्तिजननं, शस्त्रपातादिव्यथासु मूर्छतां शरीरं दधातीति धारणम्, श्रमादीनां प्रशमनार्थं ।। (डल्हण)

Rain water is fit for drinking, which is having no taste, having qualities of nector, gives life, satisfaction, satisfies the thirst, pacifies tiredness, exhaustion, thirst, intoxication, unconsciousness, drowsiness, sleep and burning sensation.

Classification

According to Suśruta

१. अन्तरीक्ष (Rain water)   २. भौम (ground water)

अन्तरीक्ष	– धार	Falls		
	– कार	Water from hail stones		
	– तौषार	dew drops		
	– हैमवति	Water from ice		
भौम	– कौप	Well water	नादेय	River water
	– सारस	Lake water	तडाग	Tank water
	– प्रास्रवण	Spring water	औद्भिद	Artesian well
	– चौण्ड्य	Step well		

According to Caraka

जलमेकविधं सर्वं पतत्यैन्द्र नभस्तलात् । (च.सू. २७/१९६)
सर्वमिति सुश्रुतप्रतिपादित धारकारहैमतौषारमपि । (च.पा.)

The entire water is only of one type, that which falls from the sky in the form of rain as directed by Indra that is *antarīkṣa* or *aindra jala*.

नदी – River water	वापि – Well water
कूप – Well water	तडाग – Tank water
उत्स – Small lake water	सर – Lake water
प्रस्रवण – Spring water	सामुद्र – Ocean water

Depending on presence of impurities

गाङ्ग – Pure water सामुद्र – Impure water

Qualities of potable water

निर्गन्धमव्यक्तरसं तृष्णाघ्नं शुचिं शीतलम्। अच्छं लघुं च हृद्यं च तोयं गुणवदुच्यते।।(सु.सू.४५/२०)

Water which is devoid of smell, taste, pacifies thirst, clean, cold, clear, light & good for heart is known as wholesome water.

Even according to modern parameters safe & wholesome water has similar definitions. It is defined as the water free from pathogenic agent, free from harmful chemical substances, pleasent to taste i.e. free from colour & odour, usable for domestic purposes.

Uses

1. House hold purpose – Ex. Drinking, cooking, washing, bathing etc.
2. Public purpose– Ex. Public cleaning, fire fighting, maintenance of gardens, swimming pools, other works.
3. Industrial purpose– Ex. Iron & steel industries, paper.
4. Agricultural purpose– Ex. Irrigation.
5. Power generations– In hydro electric power stations.
6. Carrying wastes.

Optimum quantity of water

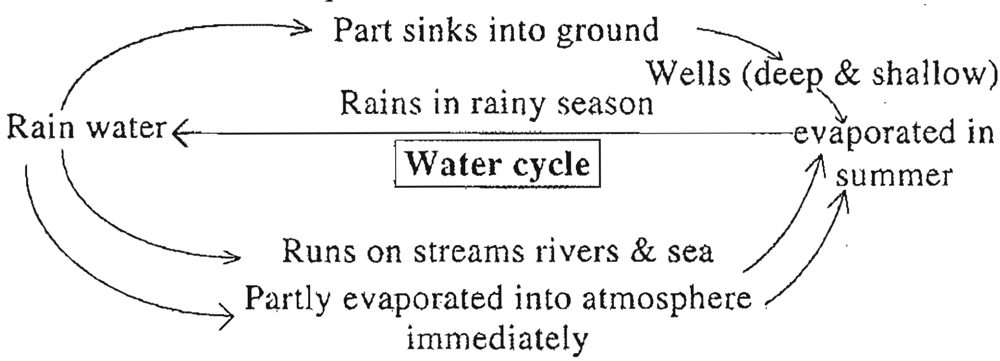
150-200 litre/per head/day water is needed.

According to modern

1. Rain water
2. Surface water – Impounding reservoir
   – Rivers & streams
   – Tanks, ponds & lakes.
3. Ground water – Shallow wells, Deep wells, Springs

Rain water

It is the most important of all waters.



According to Caraka

जलमेकविधं सर्वं पतत्यैन्द्रं नभस्तलम् ।। (च.सु. २७/१९६)

The water is of only of one type, that which falls from the sky as rain as directed by *Indra* i.e. *antarīkṣa jala or aindra jala.*

अन्तरीक्षं उदकानां ।। (च.सु. २५/३७)

Rain water is considered as the best water in *Jajjapuruṣīya* chapter of *Caraka samhita.*

Suśruta sub divides this *Antarīkṣa jala* or rain water into *Dhāra* i.e. falls, *Kāra* (water liquified from hail stones), *Touṣāra* (dew drops) & *Haima* (liquifaction of ice).

Characters

Rain water is purest form of water in nature. It has clear bright, sparkling appearance & it is very soft containing only traces of dissolved solids (0.0005%). Rain water is free from pathogenic agents.

Qualities of Antarīkṣa jala/Divyajala/Aindra jala

शीतं शुचिं शिवं मृष्टं विमलं । लघु षड्गुणं प्रकृत्या दिव्यमुदकं ।। (च.सु.२७/१९८)
शिवमिति कल्याणकरत्वात्, मृष्टमति वदनप्रीत्यत्वेन ।। (च.पा. on च.सू.२७/१९८)

Rain water is purest form of water which is cold, pure, beneficial, tasty, clear & light by nature.

Even *Suśruta* gives similar reference with its properties like nector, giving life, satisfaction, pacifies thirst, cures intoxication, unconsciousness, drowsiness, sleep & burning sensation (सु.सु.४५/३).

Natural sources of contamination

खात् पतत् सोमवाय्वर्कैः स्पृष्टं कालानुवर्तिभिः । शीतोष्णं स्निग्ध वृक्षाद्यैर्यथासन्नं महीगुणैः ।।
(च.सू.२७/१९७)

While falling from the sky the rain water comes in contact with moon, air, sky i.e. external environment in the due course of time. When it comes in contact with earth the properties of the earth like hot, cold, unctousness, taste, colour etc. are imparted to the water.

Impurities

Rain water gets impure as it comes in contact with atmosphere. It gets combined with soot, dust, micro-organism, gases like carbon dioxide, nitrogen, oxygen & ammonia.

Benefits of water

जीवनं तर्पणं हृद्यं ह्लादि बुद्धिप्रबोधनम् । तन्वव्यक्तरसं मृष्टं शीतं लघ्वमृतोपमम् ।।
तनु स्वच्छ, मृष्टं अत्यास्वादसुखं, शीतं वीर्येण, स्पर्शेन, ह्लादि सुखजनकं । (अ.हृ.५/१)

The water which is thin, tasteless, cold, light and pleasent gives life, happiness and satisfaction. It is good for heart and awake consciousness.

Types of earth, taste of water & pāñcabhautikata

तत्र लोहितकपिलपाण्डुपीत नील शुक्लेष्ववनिप्रदेशेषु मधुराम्ललवणकटुतिक्तकषायाणि यथासंख्य-मुदकानि संभवंतीत्येके भाषन्ते ।। (सु.सू. ४५/५)

Colour of earth	*Taste*	*Pañcabhoutikata*
लोहित (Red)	मधुर (Sweet)	जल *(Jala)*
कपिल (Brown)	अम्ल (Sour)	पृथ्वी *(Pṛthvi)*
पाण्डु (Pale)	लवण (Salt)	पृथ्वी *(Pṛthvi)*
पीत (Yellow)	कटु (Pungent)	तेजस् *(Tejas)*
नील (Blue)	तिक्त (Bitter)	वायु *(Vāyu)*
शुक्ल (White)	कषाय (astringent)	वायु *(Vāyu)*

अन्तरीक्ष जल (Rain water) → अव्यक्त रस (Tasteless) → आकाश (*ākāśa*)

According to Caraka & Aṣṭāṅga saṁgraha

Colour of earth	*Taste of water*
श्वेत (White)	कषाय (astringent)
पाण्डुर (Pale)	तिक्त (bitter)
कपिल (Brown)	क्षार (alkaline)
लवण (Salt)	लवण (salt)
पारावत (Pigeon)	कटु (pungent)
कृष्ण (Black)	मधुर (sweet)

अव्यक्तं ह्याकाशमित्यतः । तत् प्रधानं अव्यक्त रसत्वात् तत् पेयमन्तरीक्षालाभे ।। (सु.सू.४५/६)

Water having no taste is predominent in *ākāśa mahābhūta* and it should be used for drinking in absence of rain water.

Antarīkṣa jala (अन्तरीक्ष जल)

Dhāra (धार)

अन्तरीक्षं उदकानां । (च.सू. २५/३७)
धारा तु पर्वतादेव जलधारा रूपा पतन्ति । धाराभिः पततीति धारं ।
उक्तं च धाराभिः पतितं तोयं गृहीतं स्फीतवाससा ।
शिलायां वसुधायां वा धौतायां पतति च यत् ।।
सौवर्णे राजते पात्रे स्फटिके काच निर्मिते ।
भाजने मृण्मयोऽपि स्थापितं धारमुच्यते ।। (डल्हण)
धारं प्रधानं लघुत्वात् ।। (सु.सू. ४५/७)

The water which falls from the mountain in the form of falls is *dhārā jala*. It is important because of its lightness. This water filtered through clean cloth, stones, gravels and earth, stored in golden, silver, glass and earthen vessel is called *dhārā water*.

Suśruta classifies it into

गाङ्ग – *Gāṅga* सामुद्र – *Sāmudra*

Vāgbhaṭā classifies *Kāra* into *Gāṅga* & *Sāmudra*.

Pure water (गाङ्ग)

गाङ्गं पुनः प्रधानं ।
शाल्योदनपिण्डमकुथितमविदग्धं वर्षति देवे बहिष्कुर्वीत स यदि मुहूर्तं स्थितं तादृशः एव भवति तदा गाङ्गं पततीत्यवगन्तव्यं ।। (सु.सू. ४५/७)
गाङ्गं अश्वयुजे मासि प्रायशो वर्षति । (सु.सू. ४५/७)
अविदग्धं अविवर्णम् ।

Gāṅga water is important because of its purity.

When *odana* is kept in the water for one *muhūrta* i.e. three hours, if colour does not change, then it is *gāṅga* water. Rain water in the month of *āśvīja* is called as *gāṅga*.

Impure water (सामुद्रजल)

आविलं समलं नीलं घनं पीतमथापि वा । सक्षारं पिच्छिलं चैव सामुद्रं तन्निगद्यते ।। (हा.सं.)

Water which is contaminated, not clear, blue, thick, yellow, slimy & having more of alkali (*kṣāra*) is considered as *sāmudra*, which is not fit for use.

Tests for purity of water (Jalaparīkṣā)

वर्णान्यत्वे सिक्तप्रक्लेदे च सामुद्रमिति विद्यात् ।। (सु.सू. ४५/७)
सामुद्रमप्यश्वायुजमासे गाङ्गवत् भवति ।। (सु.सू. ४५/७)
सामुद्रमुदकं विस्रं लवणं सर्वदोषकृत् ।। (सु.सू. ४५/३७)
विस्रं त्रिदोषं लवणाम्बु यद्वरुणालयं ।। (च.सू. २७/२१६)
विस्रं आमगन्ध, वरुणालये समुद्रे ।

Śālyodana kept soaked in *sāmudra* water changes colour, becomes sticky & slimy then water is impure.

Sāmudra water also has qualities of *gāṅga* water, during the month of *āśvīja*.

Sāmudra water has got bad smell & exccess of salt in it, which vitiate all *doṣas*.

Water from hailstones (कार)

कारं वर्षपलोद्भवं ।। (सु.सू. ४५य/७) डल्हण on
करा वर्षोपलाः तेषां तोयं कारं ।

Water which forms from liqufaction of hailstones is *Kāra*.

Dew drops (तौषारं)–

अवश्यायजं निशाजलम् ।। डल्हण on सु.सू. ४५/७

Dew drops which are formed during the night time due to excess of cold.

अन्तरीक्षजल निचयजातं । डल्हण on सु.सू. ४५/७

Rain water accumulated on leaves is Tauṣāra.

Water from ice (हैमं)

स्फटिकशिला हिमोद्भवं । स्फटिकशिलाशकलसदृशावयवं हिमं तद्भवं हैमं ।(डल्हण on सु.सू. ४५/७).

Water after liquefaction of ice or *hima*.

Ground water (भौमजल)

River water (नादेय)

नादेयं वातलं रूक्षं दीपनं लघु लेखनं । तदभिष्यन्दि मधुरं सान्द्रं गुरु कफावहम् ।।(सु.सू.४५/३१)
तत्र नद्यः पश्चिमाभिमुखाः पथ्याः लघूदकत्वात् । पूर्वाभिमुखास्तु न प्रशस्यन्ते गुरूदकत्वात् ।। दक्षिणाभिमुखाः नाऽतिदोषलाः साधारणत्वात् । तत्र सह्यप्रभवाः कुष्ठं जनयन्ति, विन्ध्यप्रभवाः कुष्ठं पाण्डुरोगाश्च, मलयप्रभवाः कृमीन्, महेन्द्रप्रभवाः श्लीपदोदराणि हिमवत्प्रभवाः हृद्रोगश्वयथु शिरोरोग श्लीपद गलगण्डान् प्राच्यावन्त्याः अपरावन्त्यार्शास्युपजायन्ति पारियात्र प्रभवाः-पथ्याः बलारोग्य कार्य इति । (सु.सू. ४५/२१)

पश्चिमोदधिगाः शीघ्रवहा यश्चामलोदकाः पथ्याः समासत्ता नद्यो विपरीतस्तथोन्यथा उपलस्फालनाक्षेप विच्छेदैः खेदितोदकाः हिमवन्मलोयोद्भूताः पथ्यास्त एव च स्थिराः ।

नद्यः शीघ्रवहाः लघ्व्यः प्रोक्तायश्चमलोदकाः । गुर्व्यः शैवालसच्छन्नाः कलुषा मन्दगाश्च या ।। (सु.सू.४५/२२)

प्रायः नद्यः मरुषु सतिक्ता लवणान्विताः। लघ्व्यः समधुरश्चैव पौरुषेया बले हिताः।।(च.पा.२७/२१२)

पश्चिमाभिमुखाः जाङ्गल पश्चिम देशस्थाः, पश्चिमसमुद्रगाः, पूर्वाभिमुखाः अनूपदेशस्थाः पूर्वसमुद्रगाः, दक्षिणाभिमुखाः मध्यदेशस्थाः,

हिमवत् प्रभवाः हिमवदुपरिभागप्रभवाः पथ्याः अधोभागप्रभावास्तु हृद्रोग हेतवः ।
प्रभवा नद्यो द्विविधः-तडागजाः दारिजाश्च तडागजाः पथ्याः दारिगाश्च दोषलाः।।
(डल्हण स.सू.४५/२१)

River water aggravates *vāta,* because of dry, carminative, light, scraping and due to sweet, thick and heavy qualities aggravate *Kapha*.

Rivers flowing in western direction are conducive due to lightness. Rivers are fast moving & water is clear. *Dalhana* opines mainly these originate in *jāṅgala deśa*, so water is conducive.

Rivers flowing in eastern direction are heavy, they mainly belong to *Ānūpa* area, where diseases are more common. They are contaminated with water plants, they flow slowly, so self purification is less.

Rivers flowing in southern direction are not very harmful, as they belong to *sādhāraṇa area*. River originating from *Sahyādri* produce skin diseases. Rivers originating from *Vindhya* produce anaemia & skin disease. Rivers originating from *Malaya* produce worms. Rivers of *Māhendra* origin produce elephantiasis and ascites. Rivers of *Himālayan* origin produce heart disease, swelling, head diseases, elephantiasis & thyroid.

→ उपरिभागप्रभवाः पथ्याः
→ अधोभागप्रभवास्तु हृद्रोगादि हेतवः

Those of upper origin are conducive & those of lower origin, produce heart diseases. East of *Āvanti deśa* and west of *Āvanti deśa* produce piles.

Character

1. Turbid during rainy season & clear in other seasons.
2. Clarity is no guarantee for its purity.
3. It contains all kinds of suspended impurities & even micro-organisms.

Impurities– Rivers are direct connection between alimentary tract of people living upstream & mouths of those living down stream. Surface washing, sewage, sullage, industrial & trade wastes, drainage from agricultural area and disposal of dead bodies contaminate the river water.

Self purification– Dilution, sedimentation, aeration, oxidation, sunlight, plant & animal life help in self purification.

Effects of impure water on health

According to *Āyurveda* different disease are produced due to intake of impure water.

Rivers flowing in eastern direction produce more diseases.

Rivers originating in Sahyādri	- skin diseases
Rivers originating in Vindhya	- Anaemia, skin diseases
Rivers originating in Malaya	- Worms
Rivers originating in Māhendra	- Elephantiasis, Ascites
Rivers originating in Himālayan	- Heart diseases, swelling head diseases, elephantiasis, thyroid.
River originating in East & west of Āvanti region	- Piles

Biological contaminants produce diseases like Viral hepatitis, Polio myelitis, Typhoid, Paratyphoid, Dysentry, Cholera, Helminthitis, Leptospirosis etc.

Chemical contaminants produce chronic & acute toxicity symptoms, anaemia etc.

Contraversy between Suśruta & Caraka

नद्यः पाषाणसिकतावाहिन्यो विमलोदकाः मलयप्रभवाः याश्च जलं तस्वामृतोपमम् ।।
(च.सू.२७/२१०)

मलयप्रभवाः कृमीन् ।। (सु.सू. ४५/२१)

Here we find difference of opinion between *Caraka* and *Suśruta* regarding rivers arising from *Malaya* mountain.

It is analysed that rivers having stones & gravels, act as filters & reduce bacterial count, so they are like nector. Otherwise they produce infection which contain micro-organism or *Kṛmi.*

Lake (सारस)

तृष्णाघ्नं सारसं बल्यं कषायं मधुरं लघु ।। (सु.सू. ४५/३२)
सरो दिव्य खातं पुरुषव्यापारं विना ।। (च.पा.)
हेमन्ते सारसं तडागं वा ।। (सु.सू. ४५/)

Water from lake is astringent & sweet in taste, light & gives strength to the body. The water is pure, because of absence human contact. It is conducive in *Hemanta Ṛtu.*

Tank (तडाग)

तटादागे गतिर्यस्य सः तडागः ।।
सः पुनरुच्छदेशादागच्छज्जलबन्धनाद्भवति अन्ये तु पुष्करणीं तडागमाहुः ।।(च.पा.onच.सू.२७/२१४)

There is movement of water near the banks in *Taḍāga,* some others opine that, water which comes from higher level and blocked by artificial means is called *Taḍāga*. Some call *Puṣkaraṇī* as *Taḍāga.*

ताडागं वातलं स्वादु कषायं कटुपाकी च ।। हेमन्ते सारसं ताडागं ।। (सु.सू. ४५/८)

It has sweet, astringent taste, *kaṭu vipāka* & *vātala* properties. It is conducive in *Hemanta Ṛtu.*

Tanks– Tanks are large depressions in land, in which surface water is stored. They recieve all sorts of contaminants. Silt & colloidal matter fill the tanks, during rains. Many older tanks might have aquatic vegetations. Washing clothes, cattle, humans, cooking, swimming, regular defecation around edges render the tank unfit for potable purposes.

Sanitary tanks

1. Edges of tanks should be raised.
2. Fence should be put around the tank.
3. No one should enter directly into tank.
4. Elevated platform should be constructed to draw the water.
5. Periodically weeds should be removed.
6. The tank should be cleaned in dry seasons.

Well (वाप्य-वापी)

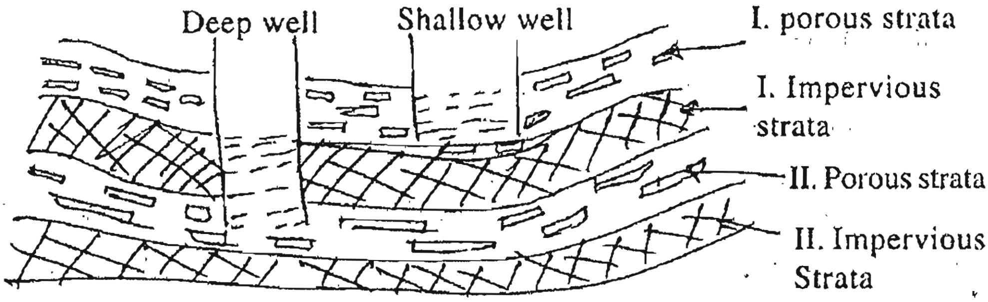
वापी इष्टिकादि बद्धतीर्था: दीर्घिका:, कूप: प्रसिद्ध: ।। (च.पा. on च.सू. २७/२१४)

Water stored in well, which is lined by bricks is known as *Kūpa.*

वातश्लेष्महरं वाप्य सक्षारं कटु पित्तलं ।। (सु.सू.४५/३३).

It is *Vāta kaphahara* in nature, which is more alkaline (hard water), pungent in taste & aggravates *pitta.*

Shallow	*Deep*
1. Taps water above I impervious layer.	Taps water above II impervious layer
2. Moderately hard	more hard
3. Heavily contaminated	Purer water
4. Usually dries in summer	provides constant water supply.



Artesian wells– Variety of deep well in which water rises above the ground level, as water level is held under pressure between two impervious strata of earth.

Ideal well

Sanitary well is properly located, well constructed & protected against contamination with a view to yield a supply of safe water.

1. Site– To avoid bacterial contamination, it should be located at least 15 m (50 ft) away from sources of contamination. It

should be at higher level than the sources of contamination. Location should be with in the range of 100 m from users.

2. Lining– It should be made of bricks & stones, coated with cement upto depth of 6 m. So that water enters only from the bottom.

3. Protective wall– Wall of height at least 70-75 cm from ground should be constructed.

4. Platform– Cement concrete platform around the well in all directions with gentle slope outwards, with drain along the edges should be constructed.

5. Covered drain– To carry spilled water to public drain or soakage pit should be constructed well beyond the area of "cone of filtration" of well.

6. Covering plate– Closed with cement & concrete plate, to prevent pollution through open top.

7. Pully or pump– For lifting water in sanitary manner a pully or hand pump is needed.

8. Responsibility of users– Strict cleanliness should be maintained.

9. Quality of water– Physical, chemical & bacteriological quality of water should be to acceptable standards of quality of safe & wholesome water.

Tubewells

Common source of drinking water. Yield bacteriologically safe water. They are cheap compared to other sources.

Galvanised iron pipe is sunk into water bearing stratum, a strainer is fixed at the bottom & handpump at the top. A water tight concrete platform is constructed.

Well (कौप)

द्विविधं कौपं सक्षारं अव्यक्तरसं च । सक्षारं पित्तलं कौपं श्लेष्मघ्नं दीपनं लघु ।
वसन्ते कौप प्रस्रवं वा ग्रीष्मऽप्येवं ।। (सु.सू. ४५/३३) (ड.)

It is more alkaline i.e. presence of excess of minerals which enhance *Pitta, Agni* gets enhanced due to its light nature and also acts as *Kaphahara*. It is conducive in *Vasanta & Grīṣma Ṛtu*.

Canals (चौण्ट्य/चौण्ट)

स्वयंशीर्णशिलास्वभ्रे नीलोत्पलनिभं जलं । लतावितानसंच्छन्नं बुधैश्चौण्डेयमुच्यते ।।

(स.सु. on अ.हृ.सू. ५/१३)

The clear water flowing through the naturally broken stone & having the colour of blue lotus. Which is surrounded by stones & filled with water plants is known as Couṇḍeya.

चौण्ट्यमाग्निकरम् रूक्षं मधुरं कफकृन्न च । (सु.सू. ४५/३४)
प्रावृषी चौण्ट्यमनभिवृष्टं सर्वद्येति ।। (सु.सू. ४५/४८)

Cauṇṭya water enhances *agni*, dry in quality, has sweet taste and does not aggravate the *Kapha*. It is conducive during *Prāvṛt ṛtu* in the absence of rain.

Small falls (प्रस्रवण)

लघुशीतामलं स्वादु प्रोक्तं प्रास्रवणं जलं । प्रस्रवणः निर्झरः । (च.पा.सू. २७/२१४)
कफघ्नं दीपनं हृद्यं लघु प्रस्रवणोद्भवं । (सु.सू. ४५/३४)
वसन्ते कौप प्रस्रावो वा ग्रीष्मेप्येवं ।। (सु.सू. ४५/८)
धारा तु पर्वतादेव जलधारारूपापतन्ति । (च.पा. २७/२१४)

Some opine that *Prasravaṇa* is small falls, which arise from mountains, water is light, carminative, *Kaphahara* and good for heart & conducive in *Vasanta* & *Grīṣma ṛtu*.

Water from sand (वैकिर)

वालुकात् समुद्भूतजलं वैकिरं । वैकिरं कटु सक्षारं श्लेष्मघ्नं लघु दीपनं ।। (सु.सू. ४५/३५)

Water derived from sand is known as *Vaikira*, which is more alkaline due presence of excessive minerals, pungent in taste, light in nature & has carminative & *Kaphahara* properties.

Kaidāra (कैदार)

कैदारं मधुरं प्रोक्तं विपाके गुरु दोषलं ।। (सु.सू. ४५/३६)

Kaidāra water has sweet taste and heavy nature & vitiates the *doṣas*.

Water stored in pot of leaves (पल्वल)

तद्वत् पल्वलमुद्दिष्टं विशेषात् दोषलं तु तत् ।। (सु.सू. ४५/३६)

Water which gets stored in pot made of leaves is known as *Palvala* water and it vitiates *doṣas*.

Springs (विदार्य औद्भिद)

विदार्य भूमिमुद्भूतं महत्या धारया स्रवेत् । यज्जलं वेदितव्यं तदौद्भिदं स्वादु शीतलं ।।
(स.सु.on अ.हृ.५/१३)

मधुरं पित्तशमनं अविदाह्यौद्भिदं स्मृतं ।। (सु.सू. ४५/३)
तत्रवर्षास्वन्तरीक्षं औद्भिदं वा सेवेत महागुणत्वात् ।। (सु.सू. ४५/८)

Water which springs from the earth & flows like a large spring or *dhāra* is known as *vaidarya* or *audbhida jala*. It has sweet taste & cold property.

According to *Suśruta* it is sweet, *pittahara* & does not cause burning sensation (*avidāhi*). It is conducive in *Varṣa ṛtu* due to its good qualities.

Spring (उत्सा)

निम्नादुत्तिष्ठ जल स्थानं उत्स । (चपा on च.सू. २७/२१३)

Utsa is a spring where water comes out from underground source like a jet.

Springs

- Shallow
- Deep
- Mineral
- Thermal

Unimportant source of water supply in this country.

Water of marshy land (अनूप जल)

आनूपदेशेयद्वारीगुरुश्लेष्मवर्धनं । (हा सं)
अनेकदोषमानूपं वार्यभिष्यन्दि गर्हितम् ।। (सु.सू. ४५/३७)
आनूपे बहूदकसंबंधात् गुरुत्वं वेद्यं ।। (स.सु. अ.हृ.सू. ४/१३)

Water present in marshy land has heavy property & aggravates *Kapha*. Due to the presence of *doṣa* in marshy land, water has *abhiṣyandi* nature. Due to the presence of excess of water in marshy land water is heavy.

Water of arid land (जाङ्गल जल)

विपरीतं मुख्यं जाङ्गलं लघुचोऽच्यते । एभिर्दोषैरसंयुक्तं निरवद्यन्तु जाङ्गलं । (सु.सू. ४५/३८)
जाङ्गलदेशे कूपादीनां सप्तानां बहूदकसंबन्धाभवात् लघुत्वं वेद्यं ।।(सर्वांगसुंदरonअ.हृ.सू.५/१३)
शैले तूदकाल्पतया लघु तरत्वं वेद्यं ।। (सर्वांगसुंदरonअ.हृ.सू.५/१३)

Opposite to the *Ānūpa* water, *jāṅgala* water is light & important. *Jāṅgala* water or water of arid land is devoid of *doṣas* & ideal for consumption.

According to *Aruṇa dutta* the well & other sources of water are not in contact with excess of water in the land, so have light property.

The water in hilly region are more light due to the presence of less water in the ground.

Water of plain land (साधारण जल)

पाकेऽविदाही तृष्णाघ्नं प्रशस्तं प्रीतिवर्धनम्। दीपनं स्वादु शीतं च तोयं साधारणं लघुः।।
(सु.सू.४५/३९)

Water of plain land are digested properly & does not produce burning sensation, pacify thirst, ideal, pleasent to mind, carminative, sweet in taste, cold & light in property.

Hot water (उष्णोदक)

कफमेदोऽनिलघ्नं दीपनं बस्तिशोधनम् । श्वासकासज्वरहरं पथ्यमुष्णोदकं सदा ।
यत् क्वाथमानं निर्वेगं निष्फेनं निर्मलं लघु ।। चतुर्भागावशेषं तु तत्तोयं गुणवत् स्मृतं ।
न च पर्युषितं देयं कदाचिद्वारि जानता ।। (सु.सू. ४५/३९-४१)

Boiled water is always conducive for health. During boiling it should be devoid of froth, clear & light. It is good for dyspnoea, cough & fever. If it is boiled till $1/4^{th}$, then it is more conducive. One which is kept overnight is not wholesome & it should never be used.

Large reservoir (ह्रदः)

तत्र ह्रदः नदीस्थजलप्रदेशो गम्भीरोजलाशयः ।। (च. पा on च.सू. २७/२१३)

Hṛda refers to large reservoir of water, which can be taken for dams built for rivers. It can be compared with impounding reservoir.

Majority of Indian cities & towns depend upon this, generally possess a high possibility of organic, bacterial & viral contamination.

Impounding Reservoirs

Artificial lakes built of earth work or masonry, dams built across rivers & mountain streams provide large reserves. Catchment area is the area draining into reservoirs. Ex. Bombay, Madras, Nagpur.

Characters– Supply fairly good quality water. Water is usually clear, palatable & ranks next to rain water in purity & softness.

Disadvantages– (1) Storing water for long time leads to growth of algae & other micro-organisms, which impart different tastes & odours.

(2) Impurities from catchment area human & animal sources make water contaminated.

Properties of water

Source of water	Rasa	Guṇa	Vīrya	Vipāka	Effects on Doṣa & body	Fit for consumption in season/month	English
1. *Antarīkṣa*							
– *Dhāra*	–	*Laghu*	–	–	–	*Aśvīja*	*Falls*
– *Kāra*	–	–	–	–	–	–	*Melted hailsone*
– *Tauṣāra*	–	–	–	–	–	–	*Dew drops*
– *Haima*	–	–	–	–	–	–	*Melted ice*
2. *Bhauma*							
Sārasa	*Kaṣāya, Madhura*	*Laghu*			*Tṛṣnāghna, Balya*	*Hemanta*	*Natural lake.*
Taḍāga	*Madhura, Kaṣāya*			*Kaṭu*	*Vātakara*	*Hemanta*	*Tank.*
Vāpi	*Kṣāra, Kaṭu*	–	–	–	*Pittakara, Vātakaphahara*	–	*Wells*
Kūpa	*Kṣāra*	*Laghu*	–	–	*Pittakara, Kaphahara, Dīpana*	*Vasanta, Grīṣma*	*Wells*
Counṭa/ Counṭya	*Madhura*	*Rūkṣa*	–	–	*Agnikara*	*Prāvṛt*	*Step well? Canal?*
Prasravaṇa		*Laghu*	–	–	*Hṛdya, dīpana, Kaphaghna*	*Vasanta Grīṣma*	*Falls*
Vaikira	*Kaṭu, Kṣāra*	*Laghu*	–	–	*Kaphaghna, Dīpana*	–	*Arising from sand*
Kaidāra	*Madhura*	*Guru*	–	–	*Doṣala*	–	*Canal*
Palvala					*Doṣala*	–	*Water in pot of leaves*
Vaidārya/ oudbhida	*Madhura*	*Śīta*	–	–	*Pittaśamana*	*Varṣā*	*Springs*
Utsa	–	–	–	–	–	–	*Springs*
Hṛda	–	–	–	–	–	–	*Dams*
Ānūpa		*Guru, Abhisyandī*			*Kaphakara*		*Marshy land*
Jāṅgala		*Laghu*					*Arid land*
Sādhāraṇa	*Madhura*	*Laghu*	*Śīta*		*Tṛṣnāghna, Dīpana, Avidāhī*		*Plain land*

Hardness of water

Soap destroying power of water is known as hardness of water.

Causes

Calcium bicarbonate Magnesium bicarbonate	} Temporary hardness
Calcium sulphate Magnesium sulphate	} Permanent hardness

Chlorides & nitrates of calcium & magnesium, compounds of Iron, Manganese & Aluminuium also produce hardness. But they are present in small quantity.

Hardness of water is expressed as milli equivalents per litre (mEq/lt).

• Soft	–Less than 1	(<50 mEq/lt)
• Moderately hard	–Less than 1-3	(50-150 mg/lt)
• Hard	–3-6	(150-300 mEq/lt)
• Very hard	–Over 6	More than 300

Disadvantages of hardness

- Require more soaps & detergents.
- When heated carbonates get precipitated & bring about furring & scaling of boilers, which lead to excess consumption of fuel.
- Bad effects cooking.
- Cloth washed in hard water donot last long.
- The life of pipes & fixtures are shortened.

Removal of hardness

Temporary hardness

Boiling – $Ca(HCO_3)_2 \rightarrow CaCO_3\downarrow + H_2O + CO_2\uparrow$

Addition of lime – $Ca(OH)_2 + Ca(HCO_3)_2 \rightarrow 2CaCO_3\downarrow + 2H_2O$

Addition of sodium carbonate

$Na_2CO_3 + Ca(HCO_3)_2 \rightarrow 2NaHCO_3 + CaCO_3$

$CaSO_4 + Na_2CO_3 \rightarrow CaCO_3 + Na_2SO_4$

Permutit process.

Permanent hardness

Addition of sodium carbonate

Base exchange process.

Base exchange process/permutit process

Treatment of large water supply is done by this method. Sodium permutit is a complex compound containing Sodium, Aluminium and silica, ($Na_2Al_2Si_2O.H_2O$) Ca & Mg ions are removed by base exchange & sodium permutit is ultimately converted into Ca & Mg permutit. Water can be converted to zero hardness.

Relation between water hardness & cardiovascular disease

$$\text{Hardness of water} \propto \frac{1}{\text{death by CVD}}$$

Qualities of potable water

निर्गन्धमव्यक्तरसं तृष्णाघ्नं शुचिं शीतलम्। अच्छं लघुं च हृद्यं च तोयं गुणवदुच्यते ।।
(सु.सू.४५/२०)

Water which is devoid of smell, taste, pacifies thirst, clean, cold, clear, light & good for heart is called wholesome water.

उदकमाश्वासकराणां, जलं स्तंभनानां ।। (च.सू. २५/४०)

Water is best soothening agent & also producing astringent effect.

Polluted water (दोषयुक्त जल–व्यापन्नजललक्षण)

तत्र यत् पङ्कशैवालहटतृणपद्मपत्र प्रभृतिभिरवच्छन्नं शशिसूर्यकिरणानिलैर्नाभिजुष्टं गन्धवर्णरसोपसृष्टं च तद्व्यापन्नमिति विद्यात्।
तस्यस्पर्शरूपरसगन्धवीर्यविपाकदोषा षट्संभवन्ति ।
तत्र खरतापैच्छिल्यमौष्ण्यं दन्तग्राहिता च स्पर्शदोषाः ।
पङ्कशैवालसिकता बहुवर्णता रूप दोषः, व्यक्तरसता रसदोषः, अनिष्टगन्धता गन्धदोषः ।
यदुपयुक्तं तृष्णागौरवशूलकफप्रसेकानापादयति सः वीर्य दोषः ।
यदुपयुक्तं चिराद्विपच्यते विष्टम्भयति वा स विपाक दोषः इति ।। (सु.सू. ४५/११)

Water which is polluted with silt, covered with water plants like *Śaivāla*, *Tṛṇa* (grass), *Padma patra* (lotus), so that rays of sun, moon or air does not enter into the water, which is having undesirable odour, colour, & taste is not fit for use. It is having six doṣas like touch (*sparśa*), appearance (*Rūpa*), taste (*rasa*), (*Gandha*) smell, vīrya (*potency*) & *vipāka* (digestion). It is called *vyāpanna jala* or polluted water.

***Sparśa doṣa*–** Roughness, slimyness, coldness & tingling sensation of teeth.

***Rūpa doṣa*–** silt, Variety of water plants, lotus, sand, abnormal colours & visible impurities.

***Rasa doṣa*–** *(Vyakta rasatā)* taste to water.

***Gandha doṣa*–** Presence of bad odour

Vīrya doṣa– Produces excessive thirst, heavyness, pain, aggravates *kapha* & produces excessive salivation.

Vipāka doṣa–Takes long time for digestion after consumption.

कीट मूत्र पुरीषाण्डशवकोथ प्रदूषितम् । तृणपर्णोत्करयुतं कलुषं विषसंयुतं ।।
योऽवगाहेत वर्षासु पिबेद्वापि नवं जलं । सबाह्याभ्यान्तरान् रोगान् प्राप्नुयात् क्षिप्रमेव तु ।।
स्नानेन त्वग्भवान् रोगान् कण्डू कुष्ठान् विसर्पकृत् । पानेन कफगुल्मानां कृमीणां वरसंभवान् ।।
(सु.सू.४५/९-१०)

Water polluted with insects, urine, faeces, eggs, wrotten deadbodies, grass, leaves, aquatic plants, impurities & poisons is harmful. If one uses it for bathing and drinking purpose, he will be afflicted with internal & external diseases immediately.

On taking bath with polluted water, person gets skin diseases like itching, leprosy, herpes & on drinking he gets *Kapha* disorders, tumour of *Kapha* variety & worms etc.

Water unfit for drinking (अग्राह्य जल)

न च पर्युषितं देयं कदाचिद्वारि जानता । अम्लीभूतं कफोत्क्लेशी न हितं तत् पिपासवे ।।
मद्यपानात्समुद्भूते रोगे पित्तोत्थिते तथा ।। (सु.सू. ४५/४१-४२)

One should not use water, which is kept stored for a long period, which is sour and increases *Kapha*. It is not good for one who is suffering from thirst, alcoholic intoxication disease & *Pitta* disorders.

Vitiated water (जलवैगुण्य)

उदकं तु खल्वत्यर्थविकृतगन्धवर्ण रसस्पर्शक्लेद बहुलमपक्रान्त जलचर विहङ्गमुपक्षीणं जलेशयं अप्रीतिकरमपगतगुणं विद्यात् ।। (च.वि. ३/७)

Presence of abnormal smell, colour, taste, touch, consistancy, where water birds die, birds get tired after drinking & not liked by aquatic animals, which is devoid of good qualities are the features of vitiated water.

Features of poisoned water (विषदुष्टजल लक्षण)

दुष्टं जलं पिच्छिलं उग्रगन्धि फेनावृतं राजिभिरावृतश्च मण्डूक मत्स्य म्रीयते विहङ्गा मत्ताश्च सानूपचरा भ्रमन्ति ।।
मज्जन्ति ये चात्र नराश्वनागास्ते छर्दिमोहज्वरदाहशोफान् ।।
गच्छन्ति तेषामपहृत्य दोषान् दुष्टजल शोधयितुं यतेत ।। (सु.क. ३/७-८)

Water slimy with quality, strong smell, frothy, with streaks & lines, where frogs and fishes die, birds get intoxicated & aquatic animals become restless move here and there, if humans, horses, serpants get immersed here, they suffer from fever, burning sense and swelling, such water is poisoned water.

This should be used after purification only.

Water pollution

Impurities — Dissolved — gases – H_2S, CO_2, NH_3, N_2
 — Minerals – Salts of Ca, Mg, Na
— Suspended –Clay, silt, sand, mud microscopic plants & animals

Sources of pollution

Sewage– decomposable organic matters, pathogens.

Industrial & trade wastes

Agricultural pollutants– fertilizers, pesticides

Physical pollutants– radio active substances

- Biological hazards
- Chemical hazards

Distribution of water

- Continuous
- Intermittant

Intermittent

1. Pipes are empty during emergency.

2. Storage is necessary, if containers are not clean it leads to pollution.

3. When pipes are empty negative pressure creates **back siphoning** of bacteria & foul gases are sucked through leaky joints.

- Single water supply
- Dual water supply – Culcutta
  - filtered
  - non filtered

National water supply & sanitatary programme in 1954

Purification of water (जलशोधन-प्राकृतशोधन)

During *Śarat Ṛtu* natural purification of water takes place.

Haṁsodaka (हंसोदक)

हंस इति सूर्यश्चन्द्रमसामभिधीयते।ताभ्यां शोधितं उदकं इति हंसोदकं।।(च.पा.on च.सू.७/४६-४७)
यदि वा हंससेवायां योग्यमुदकं। हंसा: खिल विशुद्धं उदकं भजन्ते।।(च.पा.on च.सू.७/४६-४७)

Word *Haṁsa* stands for sun & the moon, water which is purified by the rays of the sun & the moon is called *Haṁsodaka*. Some others interprit it as, water which is fit to be used by swan (*haṁsa*), as swans always drink pure water.

Self purification takes place drinking *Śarat Ṛtu.*

दिवासूर्यांशु संतप्ता निशि चन्द्रांशु शीतला । कालेन पक्वं निर्दोषं अगस्त्येनाविषीकृतम् ।।
हंसोदकं इति ख्यातं शारदं विमलं शुचि। स्नानपानावगाहेषु हितमंबु यथा स्मृतं।।(च.सू.७/४६-४७)
दिवार्ककिरणैर्जुष्टं निशायां इन्दुरश्मिभिः । अरूक्षमनभिष्यन्दि तत्तुल्यं गगनाम्बुना ।।
गगनाम्बु तत्रिदोषघ्नं गृहीतं यत् सुभाजने। बल्यं रसायनं मेध्यं पात्रापेक्षि ततः परम् ।।
(सु.सू.४५/२५-२६)

Water which is exposed to the rays of the sun during day time, rays of the moon during night time, gets purified by action of time & arrival of *Agastya* star during *Śarat Ṛtu* is free from doṣas and clear. It is good for bathing, drinking & other purposes.

According to *Suśruta,* it is comparable to *Antarīkṣa jala* which is purest form of water. If it is kept in a good container, it acts as strength promoter, rejuvenator, *tridoṣahara* & brain tonic.

द्विविधं खलु जलस्यशोधनं भवति । मार्जनं प्रसादनं चेति ।। (सु.सू.४५/)
व्यापन्नस्याग्निक्वथनं सूर्यातपप्रपातनं तप्तायः पिण्डसिकतालोष्ट्राणां वा निर्वापणं प्रसादनश्च कर्तव्यं नागचम्पकोत्पल पाटला पुष्प प्रभृतिभिश्चाधिवासनमिति ।। (सु.सु.४५/१२)

महादुष्टस्य अग्नि क्वथनं, सूर्यातपप्रपातनं अल्पदोषे, तप्तायःपिण्डादि निर्वापणं मध्यदोषे ।।
(डल्हण on सु.सू. ४५/१२)

Water which is highly polluted should be boiled, if it is polluted to less extent, then it should be exposed to sunlight. If pollution is of medium range, then red hot iron ball, sand and mud lumps should be put into water which will make the water pure.

Purification (प्रसादन)

Water is made fragrent by putting powders of aromatic plants like *Utpala, Nāgakeśara* (Messua ferria), *Pāṭala* (Sterio spermum suavelens) & *Campaka* (Michelia champaka).

तत्र सप्तकलुषरूप प्रसादनानि भवन्ति । तद्यथा कतक गोमेदक बिसग्रन्थि शैवाल मूल वस्त्राणि मुक्तामणिश्चेति ।। (सु.सू.४५/७)

Seven drugs used for purification of turbid water are *Kataka* (Strichnus potatorum), *Bisa granthi, śaivāla mūla, vastra* (cloth), *Muktā* (pearl), *Candrakānta maṇi* (lappis lezuli) & *Gomedaka* (Cat's eye).

घनवस्त्रपरिस्रावैः क्षुद्रजंत्वभिरक्षणं ।। (अ.सं.सू.६/२५)
वस्त्रपूर्तं पिबेज्जलं ।। (मनु.)

To protect from micro-organisms, one should filter water from thick cloth.

Purification of Lakes (सरः)

धवाश्वकर्णासिनपारिभद्रान् सपाटलान् सिद्धक माक्षिकौ च। दग्ध्वा सराजद्रुमसोमवल्कान् तत् भस्म शीतं वितरेत् सरस्सु ।। (सु.क.३/९)

Plants like *Dhava, Aśvakarṇa, Asana, Pāribhadra, Pāṭala, Rajadruma, & soma valka* are burnt & the ash is added after cooling in to lakes for the purpose of purification.

Storage–

सौवर्णे राजते ताम्रे कांस्ये मणिमयेपि वा। पुष्पावतंसं भौमे वा सुगन्धि सलिलं पिबेत् ।।
(सु.सू.४५/१३)

Water which is made aromatic by flowers, should be stored in gold, silver, copper, bronze, stone & earthern vessels.

Stand

पञ्चनिक्षेपणानि भवन्ति। तद्यथा फलकं, त्र्यष्टकं, मुञ्जवलयं, उदकमञ्चिका, शिक्यञ्चेति। निक्षेपणानि स्थाप्यते। शाल्मलीकाष्ठादि विरचितं फलकं त्र्यष्टकं त्रिपादिका। मञ्जवलय मुञ्जादिविरचितोवलयकारः। मञ्जादि विरचितं शिक्यंचेति ।। (सु.सू.४५/१८ डल्हण)

Water container is kept over stands of different types.

(1) Phalaka– It is made up of the wood of śālmali (Salmalia malbarica).

(2) Tryaṣṭaka– Tripod.

(3) Muñjavalaya– Round stand made of muñja grass (cane)

(4) Udakamañcika– Rectangular stand

(5) Śikya-- Hanger made of muñja grass (cane).

Seven ways of cooling

सप्तशीतीकरणानि भवन्ति। तद्यथाः प्रवातस्थापना, उदकक्षेपणं, यष्टिकभ्रमणं, आञ्चन, वस्त्रोद्धरण, वालुकाप्रक्षेपण, शिक्यावलंबनं चेति ।। (सु.सू. ४५/१९)

There are seven ways of cooling water.

1. Keeping in air for cooling
2. Sprinkling cold water on external surface of vessel.
3. Stirring with stick
4. Fanning
5. Dipping clean cloth repeatedly in water
6. Sprinkling sand
7. Hanging in hanger till it cools

Water and diseases (जल एवं व्याधि)

नाम्बु पेयामशक्त्या वा स्वल्पमल्पाग्निगुल्मिभिः।

पाण्डूदरातिसारार्शोग्रहणी शोषशोथिभिः। ऋते शरन्निदाघाभ्यां पिबेत् स्वस्थोऽपि चाल्पशः ।।
(अ.हृ.सू. ५/१३)

In the conditions like diminished digestive power (*mandāgni*), abdominal tumour (*gulma*), anaemia, ascites, diarrhoea, piles, sprue, emaciation & oedema one should not drink water or drink water in minimum quantity. Even healthy person should consume less water in all seasons except *śarat & grīṣma ṛtu.*

शीतं मदात्ययं ग्लानिर्मूर्छा छर्दि श्रमभ्रमान्। तृष्णोष्णदाह पित्तास्र विषऽण्यम्बु नियच्छति ।।
(अ.हृ.सू.३/१५)

Cold water is good in diseases like alcoholic intoxication, tiredness, unconsciousness, vomiting, giddiness, thirst, burning sense, bleeding disorders & poisoning.

Water & body weight (जल एवं शरीर)

सम स्थूलकृशा भक्तमध्यान्तप्रथमाम्बुपाः । (अ.हृ.सू. ५/१५)

If one drinks water in between food, he will have medium body, if one consumes water at the end of food then he becomes obese, some who drink water before taking food become emaciated.

Purification of Water

Purification of water

- Large scale
  - Storage
    - Physical
    - Chemical
    - Biological
  - Filtration
    - Slow sand filter
    - Rapid sand filter
  - Disinfestion
    - Chlorination
    - Ozonation
    - Ultra violet radiation
- Small scale
  - Boiling
  - Chemical
    - Bleaching powder
    - Chlorine solution
    - High test hypochlorite
    - Chlorine tablets
    - Iodine
  - Filtration

Large scale purification of water

Storage– I stage

Natural purification

Physical purification	– Quality of water improves. 90% of suspended impurities settle down, in 24 hrs by gravity. – Water clearer, allows penetration of sunlight.
Chemical purification	– Aerobic bacteria oxidise organic matter present in water in presence of dissolved oxygen. – Reduces content of free ammonia & rises nitrates
Biological purification	– Pathogenic organisms gradually die out leading to reduction in bacteria. – Bacterial count drops by 90% in first 5-7 days.

Optimum period of storage is 10-14 days.

Filteration – II stage

98-99% bacteria removed.

1. Slow sand filter – Biological
2. Rapid sand filter – Mechanical

Slow sand filters– First used in 1804 in Scotland & then in London.

Components of slow sand filters

1. Supernatent raw water 2. Bed of sand

3. Under drainage system 4. Filter control valves.

Supernatent water

It is about 1-1.5 m deep. It gives constant head of water to overcome the resistance of filter bed. It promotes down flow of water through sand bed. Raw water to undergo partial purification by sedimentation, oxidation & particle agglomeration by 3-12 hrs waiting time is furnished by filtration velocity.

Sand bed

Thickness about 1.2 m. Sand grains should be rounded with effective diameter of 0.2-0.3 mm. The sand clean, free from clay & organic matter should be used. Layer of graded gravels of 30-40 cm. prevent fine grains being carried to the drainage pipes.

Area of one cubic meter of filter presents 15000 sq. m. surface area. Percolation of sand bed is very slow, at the rate of filtration 0.1 & 0.4 m^3/hr/Sq.m. of surface.

"Heart of slow sand filters"

Vital layer– Some times after filter is laid, the surface of sand bed gets covered with slimy growth known as "Schmutzdecke"/vital layer/zooglial layer/Biological layer. This layer is slimy and gelatinous and comprises of thread like algae, planktons, diatoms & bacteria. The formation of biological layer is called "Ripening" of filter. Several days are needed for complete formation ofvital layer of 2-3 cm. thickness.

It oxidises the organic matter, filters bacteria & oxidises ammoniacal nitrogen into nitrates & helps in making water bacteria free.

Under drainage system

It consists of porous pipes for the purpose of providing outlet for filtered water & supporting filter medium above.

Filter control devices

Important element of regulating system is **venturimeter.** It measures the bed resistence or 'loss of head'. When resistance develops operator opens regulating valves to maintain constant rate of filteration.

Process of Filter cleaning

Runs for weeks or even months without cleansing. When bed resistance increases, so as the valves should be kept fully opened, it should be cleaned. Otherwise it effects filteration rate. Supernatent water is drained off & sand bed should be cleaned by "Scraping" upto 1-2 cm. After many years, when bed is 0.5 to 0.8 m thick new filteration unit should be installed.

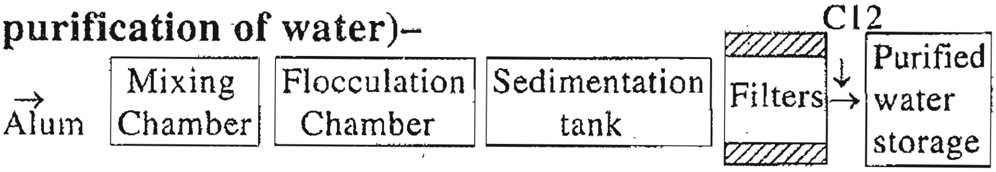
Merits

1. Construction & operation are simple.

2. Cost is less compared to rapid sand filter.

3. Physical, chemical & Bacteriological quality is higher, reduce bacterial count by 99.9 to 99.99% E. coli by 99 to 99.9%.

Rapid sand filters/Mechanical filters (Mechanical purification of water)–



1. Co-agulation chamber– Raw water is treated with 5-40 mg/lt of alum depending on the turbidity, colour, temperature & pH of water.

2. Rapid mixing chamber– It is subjected for violent mixing in mixing chamber for few minutes.

3. Flocculation chamber– Slow & gentle stirring of alum treated water occurs in flocculation chamber. Flocculator has paddles which rotate, at the rate of 2-4 rpm with the help of motor for 30 minutes. A thick, copious, white flocculent precipitate of $NH_4(OH)_2$ is formed.

4. Sedimentation chamber– Coagulated water is kept in sedimentation tank for 2-6 hrs, where flocculent precipitate with bacteria settle down. Sediment should be removed before admitting new water.

5. Filtration Unit

Each unit of filter bed is 80-90 m^2 (900 sq ft), effective size of the sand particle is, 0.4-0.7 mm. The depth of sand bed is 1 mt. Below sand, there is a layer of graded gravels of 30-40 cm deep. The depth of water is 1-1.5 m. Underdrain at filter bottom collects the filtered water. Filtration rate is 5-15 $m^3/m^2/hr$.

The alum flock part, which does not settle by sedimentation is held back by sand bed. It forms slimy layer **similar** to **zooglial layer.** Absorption of bacteria from the water & facilitation of purification, oxidation of ammonia are brought about. The suspended impurities & bacteria clog the filter. When loss of head nears 7-8 ft, filtration is stopped & filters are subjected to **"Back washing"**.

Process of Back washing– Reversing the flow of water through sand bed, dislodges the impurities & cleans up the sand bed. Washing process is stopped after clear sand is visible (Needs 15 minutes).

Merits

1. Rapid sand filter deals with water directly and no storage is required.

2. Occupies less space.
3. 40-50 times fast than slow sand filters.
4. Washing is easy.

Chemical purification of water

Chlorination– It is an additional procedure along with sand filtration. Pathogenic bacteria are killed by chlorine excluding spores & viruses. Iron, manganese & H_2S are oxidised, taste & odour producing substances are destroyed. Growth of algae & slimy organisms are controlled.

Mode of Action

Formation of Hydrochloric & Hypochlorous acids

$H_2O + Cl_2 \longrightarrow HCl + HOCl$

HCl is neutralised by Alkalinity in water.

$HOCl \longrightarrow H + OCl.$

Hydrogen & hypochlorate ions are ionised from HOCl.

HOCl is the major disinfectant

Cl_2 acts as efficient disinfectant, when pH of water is around 7. At pH above 8.5,90% of hypochlorous acid is ionised to hypochlorate ions & is useless as disinfectant. Usually pH of water is 6-7.5.

Rules of chlorination

1. Water must be clear & free from turbidity.
2. Chlorine demand of water should be calculated.

Quantity of Cl_2 to be added to water & quantity of residual Cl_2 remaining at the end of stipulated period of contact, at given temparature & pH of water is known as chlorine demand. Point at which Cl_2 demand is met is **Break point.**

3. Contact period – Free residual Cl_2 for contact period of 1 hr is essential to kill bacteria & viruses.

4. Least amount of residual Cl_2 is 0.5 mg/lt/hr.

5. Sum of Cl_2 demand + Residual Cl_2 of 0.5mg/l is the amount of chlorine required for disinfection of water.

Type of chlorination

1. Chlorine gas 2. Chloramine 3. Perchloron

Chlorine gas– It is the best choice as it is cheap, easy to apply, efficient & quick in acting. Chlorine is irritating to eyes & poisonous. Special **'Chlorinating equipment'** is necessary. For measuring, regulating & administering gaseous Cl_2 to water **Paterson's chloronome** is used.

Chloramine– It can be used instead of Cl_2 gas, it is lose compound of Cl_2 & NH_3. They usually do not give chlorinous taste. They give more resistent residual Cl_2.

Draw back– Slower in action compared to Cl_2 gas.

Perchloron/High test Hypochlorite (HTH)– It is a calcium compound with 60-70 % of available Cl_2. Solution of this is used to disinfect water.

Chlorination is done till break point. The free residual Cl_2 may be estimated by Orthotolidine - Arsenite OTA test.

Super chlorination– Ideal method for heavily polluted water, where quality fluctuates greatly. Large doses of Cl_2 is added to water & removal of excess Cl_2 is done after disinfection.

Tests for water

OT (Orthotolidine test)

Both free & combined Cl_2 can be estimated easily & accurately.

Analytical grade OT, dissolved in 10% solution of hydrochloric acid are present in reagent.

0.1 ml 1 ml water

Reagent + Cl_2 containing water ⟶ yellow

Cl_2 Intensity of colour varies with concentration of gas. OT reacts spontaneously with free Cl_2 & slowly with combined Cl_2. The readings should be taken with in 10 seconds to estimate free residual chlorine. If the colour is produced after 15 minutes, then we get the estimate of combined action of free & combined chlorine. Colour is matched with colour disc.

OTA - (Orthotolidine arsenite)

It is a modified test to overcome the interference of nitrites, iron & manganese.

Ozonation

It is an unstable gas, powerful oxidising agent, strong virucidal, eliminates undesirable odour, taste & colour.

Draw backs – After disinfection, ozone decomposes & disappears. No residual germicidal effect is present, so used as pretreatment before chlorination.

Dosage– 0.2-1.5 mg/lt.

Ultraviolet radiation

Disadvantage – Expensive treatment.

No residual germicidal effect.

Colour & turbidity reduce the power of disinfection.

Purification on small scale

(1) Boiling

'Rolling boil' for 5-10 minutes kills bacteria, spores, cysts, ova and gives sterilised water and also removes temparary hardness, but there is no residual protection.

(2) Chemical disinfection (Chemical purification)

(i) Bleaching powder– ($CaOCl_2$) Chlorinated lime. When freshly prepared, 33% of available Cl_2 is present. It loses Cl_2 on exposure to air, light & moisture. Stabilised bleach with excess of CaO is more stable.

After chlorination residual Cl_2 0.5 mg/lt should be present at the end of 1 hr.

(ii) Cl_2 solution– 4 Kg bleaching powder with 25% available Cl_2 + 20 lt. of water $\longrightarrow$ 5% Cl_2 solution. This solution loses Cl_2 on exposure to light & storage.

(iii) HTH $\rightarrow$ It has 60-70% available Cl_2 and is more stable.

(iv) Cl_2 tablets– It is suitable to chlorinate less quantity of water, 0.5 g/20 lt of water is required. It is costly.

(v) Iodine– It can be used only as emergency disinfectant. 2 drops of 2% ethanal solution of iodine/1lt water with in 20-30 minutes of contact, disinfects the water.

(vi) Potassium permangante– It alters colour, smell & taste of water, so not ideal for disinfection.

Filtration

- Pasteur chamber land filter – Porcelain 'Candle'
- Berkefeld filter – It is made of infusorial earth

- Katadyn filter – Surface is coated with silver catalyst, bacteria are killed by 'oligodynamic action'.

Procedures of Disinfection of well

***Steps*– 1. Calcalation of the volume of water in the well**

Depth of water – (h) in m.

Diameter of well – (d) in m.

$$\text{Volume 'v' in lt} = \frac{3.14 \times d^2h}{4} \times 1000$$

2. Calculation of bleaching powder needed for disinfection Horrock's apparatus.

1. Roughly 2.5 g/1000 lt water ie approximately Cl_2 of 0.7 mg/lt. is needed.

2. Bleaching powder needed for disinfection is taken in a bucket, thin paste is prepared by mixing it with water. Then add water upto 3/4 & stir well. Keep it for 5-10 minutes for sedimentation. The solution is transferred to another bucket & lime should be thrown.

3. Bucket is lowered in water & agitation done several times.

4. Contact time of 1 hour is needed for disinfection.

5. Orthotolidine test– Amount of residual Cl_2 should be estimated, if free residual Cl_2 level is less than 0.5 mg/lt, the process should be repeated.

Double pot method

Constant supply of Cl_2 in the well is brought about by double pot method. 2 cylindrical pots are placed one inside the other.

1 Kg bleaching powder }
2 Kg course sand } slightly moistened with water

Inner pot is filled upto 3 cm below hole.

Pot is placed atleast 1 m below the water level. It works effectively for 2-3 weeks.

Horrock's apparatus

1. 6 white cups of 200 ml capacity each.

2. One black cup with circular mark on in side.

3. 2 metal spoons (each holds 2 gm of bleaching powder when filled upto the brim).

4. 7 glass stirring rods.
5. One special pipette
6. 2 dropper
7. Starch iodide indicator solution
8. Instruction folder

Procedure

1. One level spoonful (2g) of bleaching powder is taken in black cup & thin paste is prepared with little water. Water is added upto circular mark and stir red well. Allow it to settle to get stock solution.

2. 6 white cups should be filled with water to be tested upto 1 cm below the brim.

3. Add 1 drop of stock solution to the 1st cup, 2 drops to 2nd cup & so on with the help of pipette.

4. A separate glass rod is used to stir each cup.

5. Wait for $^1/_2$ an hour.

6. Add 3 drops of starch iodide solution to each cup. Development of blue colour indicates residual Cl_2.

7. Note first cup which shows distinct blue colour.

8. If the 3rd cup shows blue colour, then 6 gm. of bleaching powder should be used to disinfect 455 litres of water.

Criteria for water quality

I. Physical qualities

(1) Turbidity – Free from turbidity.

– Jacksons candle turbidimeter is used to measure.

Permissible Limit – less than 5 units NTU (Nephelometric Turbidity Units).

Turbidity interferes with disinfection & microbial determination.

(2) Colour – Free from colour.

– Colorimeter is used to measure.

Permissible limit is less than 5 units TCU (True colour units)

(3) Odour – No disagreeable odour

(4) Taste – Palatable & free from disagreeable taste.

II. Chemical qualities

(1) Chlorides– Standard chloride level is 200 mg/lt & maximum permissible level is 6000 mg/lt.

(2) Hardness– Should not exceed 300 mg/lt.

(3) Free & saline ammonia – Excellent indicator of sewage contamination of recent origin, should not exceed 0.02 mg/lt.

(4) Albuminoid ammonia– Measure of decomposable organic matter, should not exceed 0.1 mg/lt.

(5) Nitrites– Pollution of recent origin except in case of deep wells, zero level in potable water.

(6) Nitrates– Indicates old contamination, it should not exceed 1 mg/lt.

(7) Oxygen absorbed– Approximate test for amount of organic matter present. O_2 absorbed at 37^0C in 3 hrs should not be more than 1 mg/lt.

(8) Microbiological quality– E. Coli faecal streptococci, Cl. perfringens, Entamoeba histolytica & helminths should not be present in drinking water.

(9) Dissolved oxygen– Not less than 5 mg/lt.

(10) Toxic substances– Arsenic, cadmium, cyanide, lead mercury, selenium should be with in permissible limits.

Chemical	Upper limit of concentration
Fluorides	0.5-0.8 mg/lt
Arsenic	0.05 mg/lt
Cadmium	0.005 mg/lt
Cyanide	0.05 mg/lt
Lead	0.05 mg/lt
Mercury	0.001 mg/lt
Selenium	0.01 mg/lt
pH range	7-8.5 mg/lt
Total solids	500 mg/lt
Total hardness	2 m Eq/lt
Iron	0.1 mg/lt
Manganese	0.05 mg/lt
Copper	0.05 mg/lt

Chemical	Upper limit of concentration
Zinc	5 mg/lt
Calcium	75 mg/lt
Magnesium	30 mg/lt
Sulphate	200 mg/lt
Chloride	200 mg/lt
Phenolic substances	0.001 mg/lt.
Gross α activity	3 pCi/l
Gross β activity	30 pCi/l

Curtecy: K. Park

III. Microbiological stadards

(1) Coliform organisms & E. coli

(2) Facial streptococci

(3) Clostridium perfringens.

Presence indicate faecal contamination.

International standards for Drinking water relate 5 quality variables.

(a) Microbiological pollutants

(b) Toxic substances

(c) Specific substances that may effect health.

(d) Characteristics affecting acceptability of water

(e) Radioactive substances.

Microbiological

(1) Through any year 95% of samples should not contain any coliform organisms in 100 ml.

(2) No samples should contain E.coli in 100 ml.

(3) No sample should contain more than 3 coliform organisms per 100 ml.

(4) Coliform organisms should not be detectable in 100 ml of any 2 consecutive sample.

Chapter- 17

LIGHT

Good lighting is a must for efficient vision, otherwise it leads to strain & fatigue to eyes.

Factors essential for good lighting

1. Quantity of light– Light should be sufficient for the vision without strain. Illumination of 15-20 foot candle is minimum requirement, it ranges from 5-100 foot candles depending on place and kind of work.

2. Distribution– Distribution of light should be uniform & of same intensity all over the field.

3. Excessive brightness– Ex: automobile headlight at night. Excessive brightness along with contrast produces discomfort & reduces vision.

4. Shadows– Slight shadows are unavoidable & sharp shadows lead to confusion.

5. Flickering– Light should be constant, without flicker, flickering may lead to eye strain & accidents.

6. Nature of light– Natural light has soothing effect to eyes. The artificial light should be as near as possible to natural light.

7. Background– Colour contrast is necessary & roofs and ceilings should have reflection factor. Walls – 50-60%, furniture– 30-40%.

Units of light

Visual light is electromagnetic radiation of wave length band 380-780 nm. Light measurement units.

Description	*Quantity measured*	*Recommended unit*	*Other units*
1. Brightness of point source	Luminous intensity	Candela	Candle power
2. Flow of light	Luminous flux	Lumen	
3. Amount of light reaching surface	Illumination/ Illuminance	Lux	Foot candle lumen per cm^2
4. Amount of light emitted by surface	Brightness/ luminace	Lambert	Foot lambert Candle/cm

Curtecy park

Natural lighting– Natural light is derived from visible sky & reflection. Lighting in the room is by reflection of light coloured objects. Efficient utilization of natural light needs proper design, location, orientation of buildings & town planning.

1. Direction– In buildings facing east or west direction the illumination varies, direct sunlight may heat up the room, especially in summer.

2. Removal of obstacles– This facilitates lighting.

3. Windows– Tall broad windows help lighting & ventilation. The window area should not be less than 10% of floor area.

4. Colours of walls of room– The full benefit of natural illumination can be obtained, when ceiling is white, upper portion of wall is light coloured & lower portion is darker. This provides comfortable contrast.

Day light Factor

Day light is measured in terms of foot candles. Day light illumination factor is the ratio of illumination inside the room to the illumination outside.

$$DF = \frac{\text{Instantaneous illumination Indoors}}{\text{Simultaneous illumination outdoors}} \times 100$$

The photo electric meter is used to measure light.

Tyes of Artificial lighting

1. Direct
2. Semidirect
3. Indirect
4. Semi-indirect
5. Direct-indirect

1. Direct lighting– In direct lighting 99-100% of light directly falls over the work area.

Advantages– It is efficient & economical.

Disadvantages– (1) Cast sharp shadows. (2) Should not fall directly into eye.

2. Semidirect– In this 10-40% of light is directed upwards & light is reflected back on object by ceiling.

3. Indirect– Light does not strike surface directly, because 90-100% of light is directed upwards towards the ceiling & the walls. It gives total illumination of the room.

4. Semi indirect– Here 60-90% of light is in upward direction & the rest downwards.

5. Direct indirect– Light is distributed equally.

Instruments of artificial light

1. Filament lamps– They are commonly used. Heated up tungsten filament of bulb emits light. Brightness depends on temperature, hotter the filament bluer the light & dust accumulated reduces the light by about 30-40%.

2. Floroscent lamps– They are economical with respect to electric current, simultaneously they are cool & efficient. The light is similar to the natural light. The glass tube is filled with mercury vapour & electrodes are fitted at each end. Inside tube is coated with floroscent chemical which absorbs the U.V. radiation.

In filament lamp light of 5% & heat of 95% are emitted. In floroscent lamp light of 21% & heat of 79% are emitted.

Lighting standards

Eye is sensitive to range of 0.1 lux - 1,00,000 is from full moon light to bright sun.

Recommended illumination IES code–

Visual work	*Illumination (lux)*
Reading	100
General office work	400
Fine assembly	900
Very severe tasks	1300-2000
Watch making	2000-3000.

(K Park)

Effects of Sun rays on the body

Sun rays have beneficial & adverse effects on the body depending on the mode & amount of usage.

Beneficial effects on the body

आरोग्यं भास्करादिच्छेत् ।

Since the ancient time people pray sun god for the purpose of preservation of health. It is very true even now, the modern texts mention about,

1. Synthesis of vitamin D_2 Cholecalciferol from its precursor vitamin D present in skin in the presence of sunlight only. Other-

wise it may lead to vitamin D deficiency, Rickets in children and osteomalacia in adults.

2. Invitro degradation of bilirubin takes place in presence of sunlight. This is being used therapeutically in premature infants with hyperbilirubinaemia.

3. It also effects biologic rythms of body temperature, physical activity, stimulation of melamin synthesis, adrenocortical secretion & food consumption.

4. In *Ayurveda* it is used as treatment in many diseases.

श्वित्राणां सविशेषं योक्तव्यं सर्वतो विशुध्दानाम् । श्वित्रे स्रंसनमग्र्यं मलपूरस इष्यते सगुडः ।।
तं पीत्वा सुस्निग्धो यथाबलं सूर्यपादसंतापम् । संसेवेत विरिक्तस्त्र्यहं पिपासुः पिबेत् पेयम् ।।
(च.चि. ७/१६२-१६३)

5. *Laṅghana* is one of important treatment modality, indicated in diseases due to over nourishment. Exposure to sunlight is one of the modes of *Laṅghana*.

चतुष्प्रकारा संशुद्धिः पिपासा मरुतातपौ । पाचनान्युपवासश्च व्यायामश्चेति लङ्घनम्।।(च.सू.२२/१८)

Four types of eliminative measures i.e. emesis, purgation, *niruha* type of enema & inhalations, thirst, exposure to sunlight, hunger, fasting & exercise are measures of *Laṅghana*.

6. *Svedana* or sudation are preparatory measures for *Pañcakarma* as well as treatment for many *Vāta & Kaphaja* disorders. Svedana also includes exposure to sunlight especially in *Niragni sveda* or sudation without fire.

व्यायाम उष्णसदनं गुरुप्रावरणं क्षुधा । बहुपानं भयक्रोधावुपनाहाहत आतपौ ।। (च.सू.१४/६४)

Exercises, warm building, heavy clothing, hunger, excessive drinking, fear, anger, poultice, wrestling & exposure to sunlight are ten ways of foementation without fire.

7. According to *Vāgbhaṭa* looking at sun is one of the treatment of diseases produced due to control of sneezing reflex.

तीक्ष्णधूमाञ्जनघ्राणनावनार्क विलोकनैः। प्रवर्तयेत् क्षुतिं सक्तां स्नेह स्वेदौ च शीलयेत्।।(अ.हृ.४/९)

Smoking, application of collyrium, instillation of nasal drops, looking at sunlight, oleation & sudation lead to manifestation of sneezing & helpful in diseases due to withholding of sneezing reflex.

8. *Haṁsodaka* the ideal water fit for drinking & bathing is purified by Sun rays.

दिवासूर्यांशु सन्तप्ता निशी चन्द्रांशु शीतला । (च.सू. ५/४६)

Water which is purified by rays of sun in day and moon at night respectively.

Adverse effects of Sunlight on the body

1. Excessive exposure to sunlight leads to sunstroke & death.

Even in *Suśruta saṁhitā* reference about *Ātapa dagdha* is found which can be related to sunstroke.

2. As it stimulates melanocytes to secrete more melanin leads to darkening of skin.

3. On exposure to sun light sunburns may be produced.

4. Some times it may lead to allergic reaction of skin i.e. photodermatitis.

6. Exposure to sunlight during eclipses leads to various hazards due to the presence of UV rays in excess. One may lose vision, if he gazes at sun directly during solar eclipse.

Chapter- 18

DISPOSAL OF SOLID WASTES

Solid wastes (Apadravya)

Solid wastes are defined as the wastes from street market, stable, industries &houses excluding sullage and night oil.

Solid wastes or refuse include garbage (food wastes), rubbish (paper, plastic, wood, metal, throw away containers, glass etc.), demolition products (brick, masonry, paper), sewage treatment residue (sludge & solids from coarse screening of domestic sewage), dead animals & other discarded materials.

Average Percapita per day solid waste is 0.25-2.5 kg.

Accumulated waste is hazardous to health.

- decomposed products favour breeding of flies.
- pathogens grow & spread.
- water & soil pollution are produced.
- lead to unsighty appearance & bad odour.

Sources of refuse

- Street refuse → leaves, raw paper, animal dung, litter of all kinds.
- Market refuse → putrid vegetables, animal matter.
- Stable litter → animal droppings, left over eatables
- Industrial refuse→ $CaCO_3$ to highly toxic explosive compounds
- Domestic refuse → Paper, clothing, vegetable wastes.

Quick removal & disposal of refuse is needed.

Storage bins

1. Galvanised steel dust bin with cover should be used, size depends on amount of waste formed.

2. Paper sack. 3. Public bins

Refuse collection

1. Best method→ House to house 2. In India→ Public bins

Sweepers are necessary for collection & for transport trucks are needed.

Environment hygiene committee (1949) recommends home to home collection & enclosed van for transport of waste. Recently **"Dustless Refuse Collectors"** are being used.

Disposal methods

1. Dumping (क्षेपण)
2. Controlled tipping/sanitary land fill (भूमिपूरण)
3. Incineration (भस्मीकरण)
4. Composting
5. Manure pits
6. Burial.

1. Dumping (Kṣepaṇa)

Refuse is dumped in open ditches. Bacterial action, lead to decrease in volume of refuse & transformation into humus. In Calcutta this method is adopted, later land is leased for cultivation.

Disadvantages

1. Open dumping refuse is exposed to flies & rodents.
2. Creates unsighty appearance & bad odour.
3. Loose refuse gets dispersed all over by wind.
4. Dumping produces pollution of surface & ground water.
5. It is insanitary method, which produces environment pollution & health hazards.

2. Controlled tipping/sanitary land fill (भूमिपूरण)

Most satisfactory method, where suitable land is available in abundance for refuse disposal. Wastes are disposed in trench, at the end of each day & it is covered with mud.

- Trench method
- Ramp method
- Area method

1. Trench method– Level ground is selected. Trench of 2-3 m deep & 4-12 m. wide is prepared. Refuse is compacted & covered with soil, where 2m deep trench is dug, it needs 1 acre of land/ year for 10000 population.

2. Ramp method– Where area is sloping, instead of digging trench it is utilized. Earth is used for covering waste.

3. Area method– Depression in clay pits in the land are used for disposal. Refuse is deposited, packed & consolidated in uniform layers upto 2-2.5 m. Each layer is covered with 30 cm thick mud.

Disadvantage

1. Mud to cover should be got from outside.
2. More land is needed, so it is not suitable for cities.

Refuse reduces by
- Chemical
- Bacteriological
- Physical changes

Temperature rises by 60°C with in 7 days kills pathogens, hastens decomposition and cools down by 2-3 weeks. 4-6 months are needed for the decomposition of the organic impurities into innocuous mass.

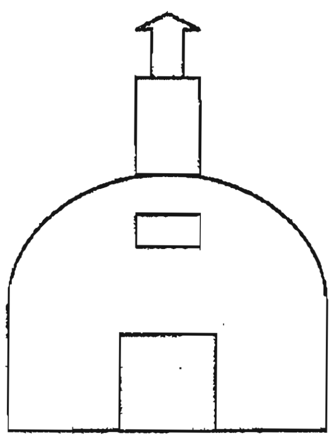
3. Incineration

Refuse can be disposed hygienically by burning or incineration.

- Hospital refuse is ideally disposed by incineration.
- Industrialised countries, particularly large cities due to scarcity of land adopt this method. This method is not suitable for India.

Disadvantages

1. Heavy out lay & high expenditure is necessary.
2. Manipulations are difficult.
3. Refuse contains fair amount of fine ash, which makes burning difficult.



Ordinary incinerator

Advantages

1. Best method where suitable land is not available.
2. Refuse rendered harmless and reduced to 1/4 the weight.
3. Residue left behind is called **clinker,** can be utilized for road making.

Principal parts

- Furnace/combustion chamber – made of fire proof bricks with cement lining.
- Suitable arrangement with platform for tipping refuge through feeding holes.
- Stokers for raking of refuse forward to fire.
- Baffle plate is so placed that, all fumes are driven through hottest part of incinerator.

Types
- double cell meldrum
- single cell Horsfall destructors

Disadvantages

1. Manure materials are burnt.
2. Offensive smoke is produced.
3. High temperature of $648.8^{0}C$ is produced.

4. Composting

Disposal of refuse & night soil or sludge together is done in composting. It is the process of nature, where organic matter is broken down into humus like material called compost, in presence of bacteria, which has manurial value.

- Main byproducts are Carbon dioxide, water & heat.
- Heat produced is $60^{0}C$ or higher, which destroy the eggs & larvae of flies, weed seeds & pathogenic agents over a period of time.
- End product contains few organisms or no pathogenic organisms. It is good soil builder containing small amounts of nitrates & phosphates.

Types
- Bangalore method – Anaerobic method
- Mechanical composting – Aerobic method

Bangalore method (Hot fermentation process)

Indian Council of Agricultural Research at the Indian Institute of Science, Bangalore has developed this process. It is also known as Anaerobic composting or Hot fermentation process. Trenches are dug of following dimensions- 90 cm - deep, 1.5-2.5 m – broad & 4.5-10 m – long. It should be present at least $^1/_2$ k.m. away from city.

Procedure– 15 cm of refuse at bottom & 5 cm of night soil are alternately put, upto 30 cm above ground level. Top layer should be of refuse of atleast 25 cm thick. Heap is covered with mud, so that legs donot sink into the mass.

Process– With in 7 days due to bacterial action, heat of above 60^0C is generated. Intense heat persists upto 2-3 weeks, decomposes the refuse, night soil & kills pathogenic & parasitic organisms.

Time– 4-6 months is necessary for decomposition. End product is odourless innocuous material of high manurial value. This process is not suitable for places above 1,00,000 population.

Mechanical composting (Aerobic method)

This process is more popular. Literally compost is manufactured on large scale by processing raw materials & turning out into finished products.

- Breeze – Coal
- Softcore – Vegetable & animal debris are sorted
- Hardcore – Hard material like bones, wood etc.

They are sorted out from the residue.

(1) Refuse is cleaned off hard material like logs, bones, metals, glass items, which interfere in grinding process.

(2) Pulvurizing equipments make size of particles to less than 2 inches.

(3) Then the material is mixed with sewage, sludge or night soil in rotating machine & incubated.

Factors to be controlled

- Carbon nitrogen ratio
- Moisture
- Areation
- Temperature
- pH

The entire process is complete whithin 4-6 weeks.

5. Manure pits

It is the method suitable for rural area, where there is no system of collection of refuse.

Advantages– It is less expensive, simple & effective.

Disadvantage– Needs space.

Method– Garbage, cattle dung, straw & leaves should be dumped into manure pits & covered with earth after each day's dumping. 2 such pits are needed.

Time– In 5-6 months time refuse is converted into manure.

6. Burial

Suitable for small camps

Method– Trench – 1.5 m wide
2 m deep is dug

- At the end of day refuse is covered with 20-30 cm mud.
- When it reaches 40 cm below ground level, it is filled with mud & compacted.

Time–
- 4-6 months for decomposition
- Measures for proper disposal, public education
- Economics & finance
- International co-operation

International solid wastes & public cleansing association ISWA in 1970 was setup, WHO has setup International Reference Centre at Switzerland.

Methods of solid waste disposal

Suitable for villages

1. Controlled tipping or sanitary land fill 2. Manure pits.
3. Burial

Suitable for cities

1. Incineration
2. Composting
   - Bangalore method → ideal for cities with population below 1 lakh
   - Mechanical method → all cities.

Chapter- 19
EXCRETA DISPOSAL

Human excreta is a source of infection & cause of environment pollution, if not disposed off in a sanitary way. It leads to soil pollution, water pollution, contamination of food & breeding of flies. Infectious diseases like typhoid, paratyphoid, dysenteries, diarrhoea, cholera, hookworm, ascariasis, viral hepatitis etc may be produced.

Problem

74% of Indian population go to fields for defecation in rural areas.

Faeces → soil pollution
Faeces → water pollution
Faeces → food contamination
Faeces → Breeding of flies
Sanitation → | (barrier)

Sanitation acts as a barrier to transmission of faecal born diseases.

Methods of excreta disposal

I. Unsewered area

1. Service type (conservency system) → old method
2. Non service type/sanitary latrines

Permanent toilets

- Bore hole latrines
- Dug well or pit latrines
- Water seal latrine — PRAI / RCA

} suitable for village, mixed mode of waste disposal

- *Sulabh śaucālaya*
- Septic tank
- Aqua privy
- Chemical closet

} modern method of waste disposal

Temporary toilets

- Shallow trench latrine } suitable for camps & fairs
- Deep trench latrine }
- Pit latrine

II. Sewered area

Modern methods of waste disposal.

a. Primary treatment

- Screening
- Removal of grit
- Plain sedimentation

b. Secondary treatment

- trickling filters
- activated sludge process.

c. Other methods

- Sea out fall
- River out fall
- Sewage farming
- Oxidation ponds.

Service type/Conservancy system (Prācīna vidhi)

Collection & removal of night soil from bucket or pail latrines, by servants is called service type or conservancy system. 'Night soil carts' were used for transportation. It used to be disposed by composting or barial in shallow trenches.

Disadvantages

1. Night soil is exposed to flies & possibility of water & soil pollution.

2. Buckets & pans are subjected for corrosion, as there is need for frequent replacement.

3. Emptying of buckets is not always satisfactory.

4. Difficult to recruit the adequate staff.

5. When sweepers go on strike whole system disrupts.

6. It is not recommended by Environment Hygiene Committee.

Non service type of latrines

Sanitary latrines criteria

Excreta should not contaminate ground or surface water, pollute soil or not be accessible to flies, rodents, animals & other vehicles of transmission, should not create nuisance due to odour or unsighty appearance.

Bore hole latrine

It is maximum used non service type latrine.

Dug { Circular hole30-40 cm → diameter
12-16 inch
Depth 4-8 m usually 6m/20ft.
13-26 ft }

In loose & sandy soil, hole is lined with bamboo matting or earthen ware rings, to prevent caving of soil.

- **Auger** is needed to bore the hole.
- Concrete squatting plate with central opening & foot rests are placed over the hole.
- Suitable covering is put to provide privacy.
- For family of 5-6 members above said latrines serves for one year.
- When bore hole reach upto 50 cm below ground level, squatting plate is removed & hole is filled with the soil.
- Night soil reduced by **Anaerobic** digestion and finally converted to harmless mass.

Advantages

1. Sweeper for removal of night soil is not required.
2. Pit is dark & not suitable for breeding.
3. If it is 15 m. away from the source of water supply, there is no danger of water pollution.

Disadvantages

1. Small capacity makes bore hole fill fast.
2. Special equipment auger is needed for the construction.
3. Where subsoil water is high & soil is loose, it is difficult to dig the hole below 3 m.
4. It is not suitable for modern life style.

Dug well latrine

It is an improvement over the borehole latrine. Circular pit of 75 cm (30 inch) diameter, 3-3.5 m (10-12 ft) depth or reduced to 1.5-2 m (6-7 ft) depth is made.

Pit is lined by pottery rings to prevent caving of soil in loose soil. Concrete squatting plate is fitted at the top. To provide privacy suitable structure is constructed. The night soil is disposed by anaerobic digestion.

Advantages

1. Easy to construct & no special equipment Auger is required.
2. Greater capacity leads to longer life than borehole latrine.
3. For family of 4-5 members, it lasts for five years.

Water seal latrine

Squatting plate is fitted with "water seal".

- Small depth of water contained in a bent pipe called the 'trap', prevents access to fly.
- Prevents escape of obnoxious odours & foul gases.

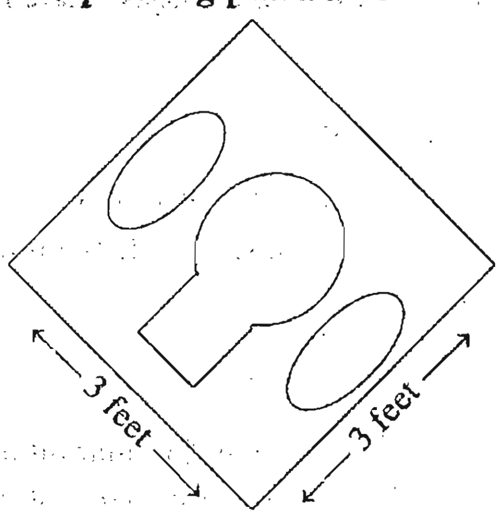
Types– PRAI → Planning research & action institute Lucknow (UP) has developed this types.

Direct / Indirect → RCA → Research cum action projects in Environmental sanitation of ministry of health.

1. Location

Atleast 15 m or 50 ft away from the source of water. It also depends on porosity of soil, level of ground water, its slope & direction of flow.

2. Squatting plate/slab



It should be made of impervious material, so that it can be washed, cleaned & dried easily.

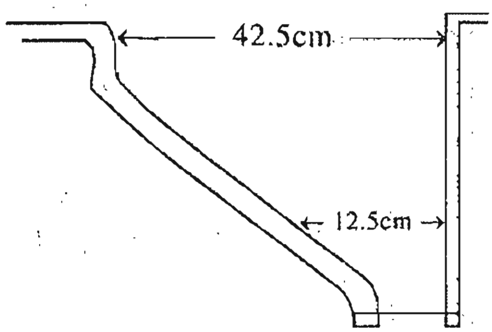
- So that hook worm larvae do not survive.
- Habits of people should be kept in mind.

Dimension

- 90 cm (3 ft) square
- 5 cm (2 inch) thick
- $^1/_2$ inch slope towards pan, so that drainage is proper.

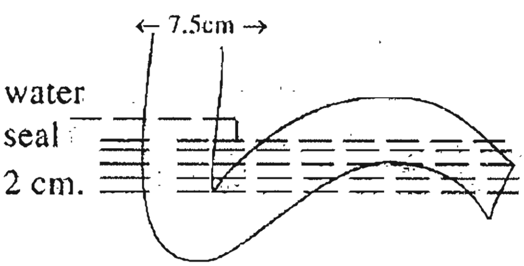
It is provided with raised foot rests.

3. Pan



It recieves night soil, urine & waste water. length 17" (42.5 cm), width (front portion) → 12.5 cm (5 inch) & (widest portion) → 20 cm (8"), uniform slope should be present from front to back of pan. It should be impermiable & have a smooth finish to prevent sticking of excreta.

4. Trap



Trap is a bent pipe 7.5 cm (3") in diameter, which holds water & maintains water seal. Depth of water seal should be 2 cm or 3/4" in RCA type

5. Connecting pipe

When pit is away from squatting plate, connecting pipe of atleast 1 m (3 ft) length, 7.5 cm (3") diameter with bend at the end is connected with trap.

Advantage– When pit fills in, a second pit may be made functional by simply changing the direction of connecting type.

Direct type–

Advantage–
- Suitable for harder ground.
- Cheaper & easier for construction.
- Needs less space.

6. Dug well

Pit of diameter of 75 cm (30 inch). Depth of 3-3.5 m (10-12 ft.) is constructed. Lining of pottery ring or bamboo matting should be provided to prevent caving of loose ground.

7. Enclosure

It provides privacy & shelter.

8. Maintenance

(1) Refuse or debris should not be put inside.

(2) It should be washed, cleaned & dried regularly.

(3) One to 2 litre of water should be used for flushing.

Biological method (जीवाणुविधि)

Septic tank

Septic tank is a water tight cement tank, where domastic sewage is admitted for treatment. Ideal for individual or small group of houses with adequate water supply.

Design– It is of 2 types

- Double chambered
- Single chambered

1. Capacity depends on number of users. 20-30 gallons or $2^{1}/_{2}$-5C. ft per persons, minimum of 500 gallons is necessary.

2. The length should be twice the breadth.

3. Depth should be 1.5-2 m (5-7 ft)

4. Liquid depth must be only 1.2 m (4 ft)

5. Air space of minimum 30 cm (12") should be left.

6. Bottom should be sloping towards the inlet, which facilitates retention of solids.

7. The pipes which are submerged, should be provided in opposite sides for entry & exit of sewage.

8. It should be covered with concrete slab provided with a man hole.

9. Sewage is retained for 24 hours in India.

Functioning

I-Stage– Solids settle down & form **'sludge'**. Lighter solids like grease & fat come up to surface & known as **'scum'**. The anaerobic bacteria & fungi break down complex chemicals into simple ones. **Anaerobic digestion–** The solids are transformed into liquids & gases mainly methane.

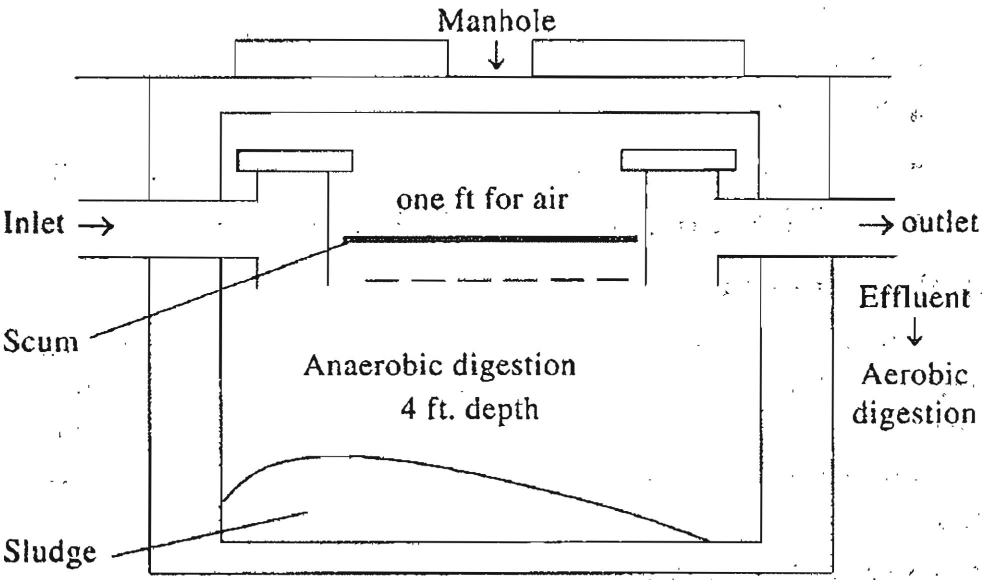
II-Stage– Liquid passes out from time to time & is called as **'Effluent'**, numerous bacteriae, helminthic ova, organic matter are present in solution or fine suspension. Effluent percolates into the subsoil. The aerobic bacteria in soil convert the organic matter to nitrates, carbon dioxide & water, which is known as **Aerobic oxidation.**

Septic tank maintenance

1. Soap water & disinfectants should not be used as they are injurious to bacteria of the septic tank.

2. Excessive accumulation of sludge decreases the capacity & interferes with the working of septic tank. So once in a year **Desludging** should be done.

3. Newly constructed tank should be first filled with water upto the outlet level & seeded with ripe sludge from the already operational tank.



Septic tank

Aqua Privy

It consists of a water tight chamber filled with water. A short pipe from latrine dips into the water in the rectangular or circular tank. Capacity is one cubic metre or 35 cu. ft for small family, it lasts for about 6 or more years. Night soil is purified by anaerobic digestion. For the escape of gases, it is provided with vent which opens at the roof of the house. The effluent enters the subsoil irrigation or absorption.

Sulabh Śaucālaya

Patna based firm designed this low cost pour flush, water seal type of latrine. Specially designed pan is used here.

Water seal trap connected to 3 feet long, broad & deep dugwell.

Bacterial decomposition transforms excreta to compost. It equires less water. Lavatory block of several dozen seats with bathing block adjoining are constructed.

Chemical method

Chemical closet (रासायनिक विधि)

It is not commonly used in Indian conditions.

- Closet consists of metal tank containing disinfectant fluids.
- Ingradients are mainly formaldehyde & quarternery ammonium compounds.
- Water dye & deodorizing substances are also used.
- Seat with the cover is placed directly over the tank.
- Except toilet paper nothing should be put into the closet.

Temporary setup (अस्थायी शौचालय)

Shallow trench latrine

Trench is dug with ordinary tools. It is 30 cm wide 3-3.5 m long, 90-150 cm deep. It can be 3-3.5 m deep depending pon the necessity. Each time after defecation it should be covered with mud. When trench is filled upto 30 cm below the ground, cover it with mud.

Deep trench latrine

In camps of longer duration, deep trench latrines are ideal.

Trench dimensions → 1.8-2.5 m (6-8 ft) deep
75-90 cm wide

Seat or squatting plate should be provided along with an enclosure to provide privacy.

Water carriage system/sewage system (Disposal of Excreta through canals dug in land)

Collecting & transporting of human excreta & waste water from residential, commercial & industrial areas by a network of underground pipes called sewers, to the place of ultimate disposal. It is the method of choice in cities & towns of high density population.

Types (1) Combined sewer systems carry sewage & surface water.
(2) Separate sewer system → system of choice.

Elements

1. House hold sanitary fittings (plumbing system of building).
2. House sewers
3. Street sewers/Trunk sewer
4. Sewer appurtenances : Manholes, traps etc.

1. House hold sanitary fittings

Every house is expected to be connected to the nearest sewer.

1. Water closet — Indian squatting type / Western commode type
2. Urinal
3. Wash basis

Water seal should not be more than 7.5 cm. Any sharp corners should not be there in trap designs. Volume of water should be as little as possible, should not be more than 1.75 lt. It should be provided with flushing rim, excreta should not soil sides of the closet, The closet should be connected to the cistern by a pipe of 2.5-3.75 cm diameter. Flushing cistern holds 15 lts of water.

2. House sewer

It is 4 inch (10 cm diameter) pipe, laid below the ground on concrete bed. It drains to public sewer.

3. Public sewer

Trunk should not be less than 22.5 cm (9") diameter. Bigger ones are 2-3 m in diameter. They are laid on cement concrete bed about 3m below the ground level, with sufficient sloping to ensure **self cleaning velocity**, of 2-3 ft/second. Trunk sewer collects sewage from many houses & transports to the main sewage treatment plant.

4. Sewer appurtenances

Manholes → opening built into sewage system

Gully, Grease, Siphon trap → Traps → devices to prevent foul gases entering houses, to remove sand, grit & grease from the sewage.

Manholes– They are located–

1. At a place where there is change in direction of sewers.
2. At connecting point of 2 or more sewers.
3. At a distance of 100 m long straight line.

Workers are liable to gas poisoning, asphyxia

Traps– They are present–

1. Under wash basin or closets.
2. Intercepting trap, where house sewer joins the public sewer.
3. Where surface waste water enters the drain.

'Sewage' is waste water from a community containing solid & liquid excreta derived from houses, street & yard washing, factories & industries.

'Sullage' is waste devoid of human excreta eg. waste water from kitchen & bathroom.

Amount of sewage flow depends on

1. Habits of people
2. System ie combined, separate
3. Time of day

Average amount of sewage flow, through a sewage system in 24 hrs is know as **'Dry weather flow'**.

Composition of sewage

99.9% water

0.1% solids — Organic → offensive smell
                    — Inorganic

partly — suspension
         — solution

organisms → E. coli, Cl. perfringens.

(The methods for purification of liquid part of waste products) sewage treatment

Aim → To stabilize organic matter for the safe disposal.

→ To convert sewage water into effluent of acceptable standards of purity, so as to dispose off into land, rivers or sea.

Test (BOD) → biochemical oxygen demand.

Amount of oxygen absorbed by a sample of sewage, during specified period, generally 5 days at 20°C, for aerobic destruction or use of organic matter by living organism.

BOD – 300 mg/lt or above → strong sewage
– 100 mg/lt → weak sewage

Chemical oxygen demand (COD)

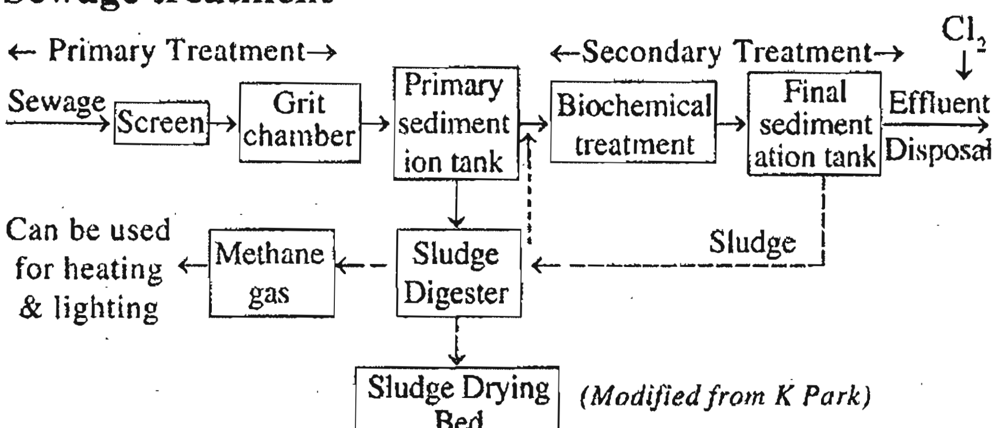
Measures of oxygen equivalent of that portion of organic matter in a sample, which is susceptible to oxidation by strong chemical oxidizer.

Suspended solids– 100 ppm (mg/lt) – weak sewage
100-500 ppm (mg/lt) – strong sewage

Decomposition of organic matter

- Aerobic process → (वायवीयविधि) — CO_2, water, NH_3, nitrites, nitrates, sulphates are liberated by the action of bacteria, fungi, protozoa
- Anaerobic process → (अवायवीयविधि) — Methane, NH_3, CO_2, H_2 are formed by anaerobic organisms slow &complex mechanism.

Sewage treatment



(Modified from K Park)

Sewage treatment plants are based on biological principles of sewage purification, where purification is brought about by action of anaerobic & aerobic bacteria.

Stages

- Primary treatment
- Secondary treatment

Primary treatment

- Screening
- Grit chamber
- Primary sedimentation

Screening

Metal screen– It screens large floating objects like pieces of wood, rags, masses of garbage, dead animals etc. Removal of them is essential, because it may block the treatment plant.

The screen is made of vertical or inclined steel bars 5 cm apart.

Screen — Moving
Screen — Fixed

The screen is removed from time to time & waste is disposed by trenching/burial.

Grit chamber/Detritus chamber

It is a long narrow chamber approximately 10-20 m long, designed to maintain a constant velocity of 1 foot/second. Detention period is 30 sec to 1 minute. Here settlement of heavier solids like sand & gravel takes place. Organic mater passes through. The Grit is collected at the bottom & removed periodically & disposed off by trenching or burial.

Primary sedimentation tank

It is a huge tank rectangular in shape, with the capacity of about 1/4 to 1/3rd of dry weather flow. The sewage flows slowly at about 1-2 ft/minute. It is retained for 6-8 hrs in the tank.

Action– The suspended matter sediment, about 50-70% solids settle by gravity and reduction of about 30-40% coliforms occurs.

The organic matter is **sludge**. The fat grease which come to surface is called as **scum,** which is removed periodically & disposed. Organic trade wastes are treated with lime, aluminium sulphate & ferous sulphate, complex organic matter breaks down to simpler substance & ammonia.

Secondary treatment–

Organic matter in the colloidal state or solution, having numerous living organisms is subjected to aerobic oxidation in secondary treatment.

It is of two types– (1) Trickling filter method
(2) Activated sludge process.

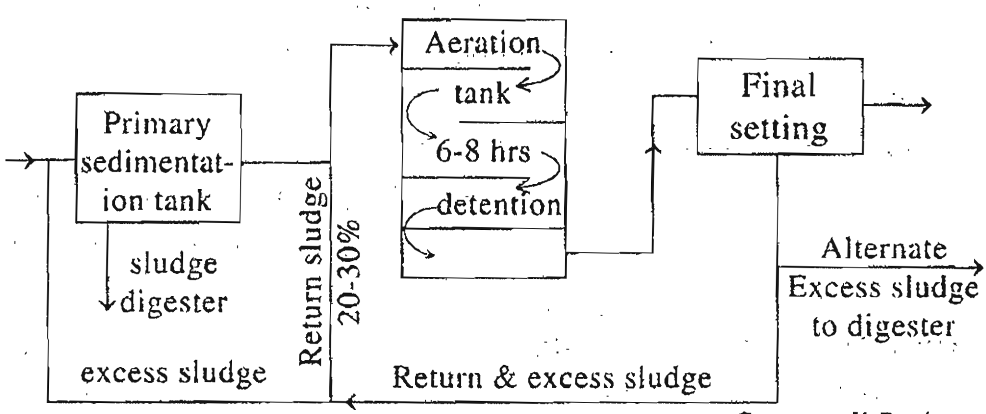
(1) Trickling filter method

Trickling or percolating filter– Bed of the filter is made of crushed stones or **cinker**. It is 1-2 m deep & 2-30 m diameter.

Effluent from primary sedimentation tank is sprinkled uniformly on the surface of the bed, by revolving device consisting of hollow pipe having rows of holes.

- The surface & bottom of filter consist of complex biological growth, comprising of algae, fungi, protozoa & bacteria of many kinds. It is known as **Zooglial layer** or biological layer.
- Effluent is oxidised by the action of bacterial flora, while it fillters through cinkers, so it is called as **Biological filter**. Dead matter falls off, gets detatched & is washed down the filter. The light green flocculant material is called **humus**.

2. Activated sludge process



Curtecy: K Park.

It is one of the modern methods. 'Heart' of this process is **aeration tank.** Effluent from the primary sedimentation tank is mixed with the sludge from the final settling tank (activated sludge rich in aerobic bacteria).

Slugde → 20-30%
Effluent → 80-70% } Proportions

This combination is subjected to aeration in aeration tank for 6-8 hrs, which is **heart of activated sludge process.** The mechanical agitation or forcing compressed air from the bottom of the aeration tank ie. diffuse aeration (better method.) is used for aeration.

The organic matter is oxidzed to carbon dioxide, nitrates & water by the bacteria. The typhoid & cholera bacteria are surely destroyed & coliforms are reduced in number.

Advantage– It requires less place.

Disadvantage– (1) It is costlier

(2) Requires skilled operations

Secondary sedimentation

Sewage is detained for 2-3 hrs. here. Sludge is known as **'aerated sludge'** or activated sludge. It is not offensive, rich in bacteriae, nitrogen & phosphates.

It is valuable manure if dehydrated. A portion of activated sludge is pumped into aeration tank in activated sludge process. Rest is transferred into sludge digestion tank for treatment & disposal.

Process of Sludge digestion

One million gallon of sewage produces 15-20 tons of sludge. Sludge is thick black liquid, containing 95% water with obnoxious odour.

Methods of Disposal → Digestion
→ Sea   Disposal → pumping into sea
→ Land   Disposal → composting with the town refuse.

Digestion– In the sludge digestion tanks, sludge is incubated under favourable conditions of temparature & pH. **Anaerobic auto digestion** takes place & releases water, carbon dioxide, ammonia & methane. Required time for this conversion is 3-4 weeks.

Residue is inoffensive, sticky & tarry mud, which will dry quickly & act as an excellent manure.

Methods of Disposal of effluent

1. Dilution → Disposal into rivers & streams. Effluent should not have more than 30 mg/lit of suspended solid, BOD should not be more than 20 mg/lt.

2. Disposal on land → used for irrigation purpose eg. Okhla sewage treatment plant in Delhi.

Other methods of sewage disposal

- Sea out fall
- River outfall
- Land treatment/sewage farming
- Oxidation ponds
- Oxidation ditches

Sea out full (Disposal in sea)

- Suited for sea coast towns
- Ex Bombay– 2/3rd of sewage is disposed into Arabian sea,

Mechanism– Purification takes place by dilution, and solids get oxidised.

Disadvantages– Offensive solid matter may be washed back to beach & produce nuisense. It can be prevented by designed discharge to deep sea at many points.

River out fall

Raw sewage should never be disposed into river. Purification takes places by.

- dilution
- aeration
- self purification

Land treatment/sewage farming

The sufficient suitable & porous land should be available. After the grit removal, screening & short period of settlement, effluent can be discharged to the land, 1 Acre land is needed for treating sewage of 100-300 persons.

Methods

1. Land is made into furrows & ridges by ploughing.

2. Crops should not come in contact with sewage & foods likely to be eaten raw should not be grown.

3. Fodder, grass, potatoes, fruit trees like plantain can be grown. Sugar cane, coriander, cucumber and tomato should not be grown.

In rainy season it is not possible to operate. Badly managed farms stink & cause **sewage sickness**, due to lack of sufficient aeration. Alternate methods should be used for rainy season.

Oxidation ponds/waste stabization pond/redox pond/sewage lagoons (Disposal in old lakes)

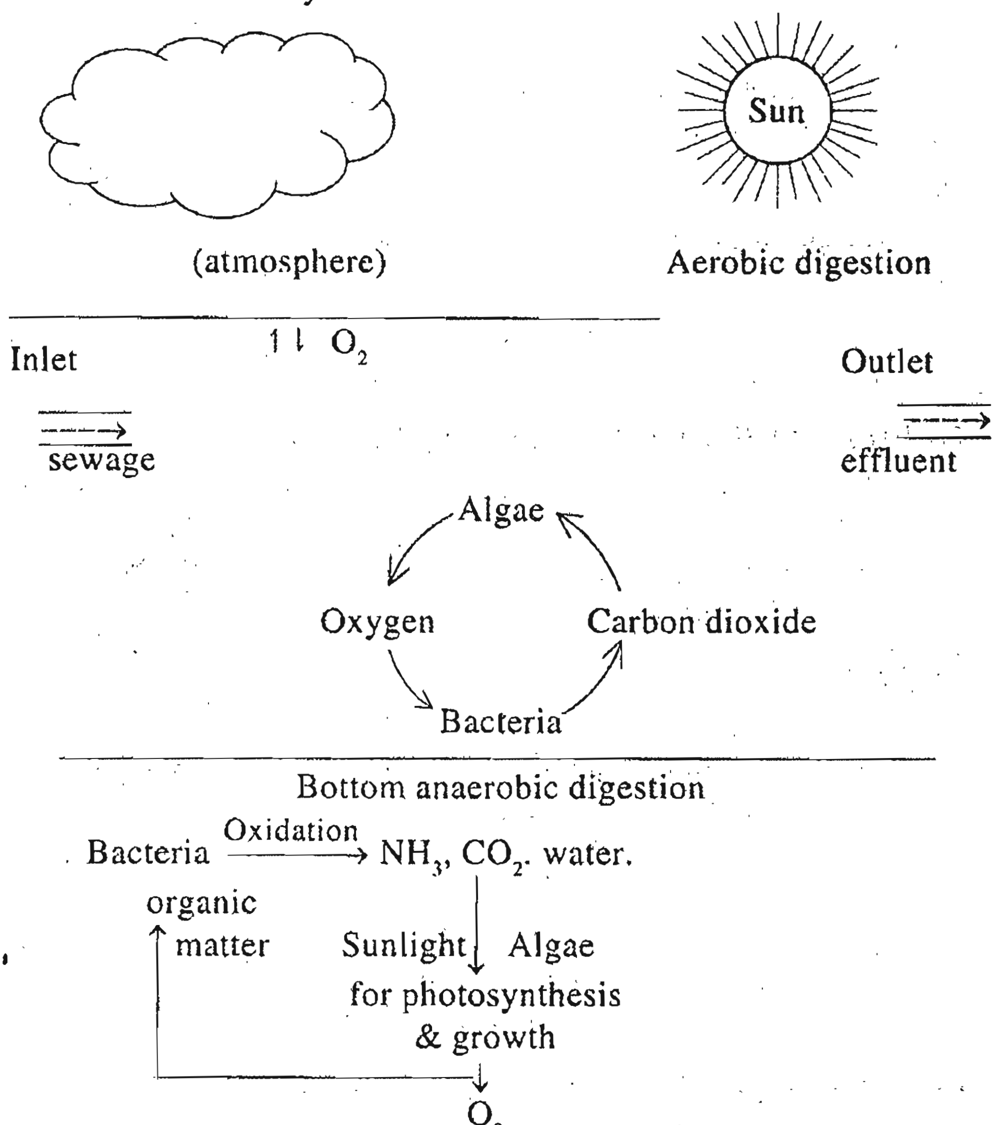
- One of the cheapest methods.

- Open shallow pond of 1-1.5 m deep with an inlet & outlet is oxidation pond.
- The Algae & bacteria feeding on organic matter are essential.
- Sunlight is essential. Organic matter is oxidised by bacteria & converted into carbon dioxide, methane & water.

Upper layer ⟶ Aerobic oxidation

Lower ⟶ Anaerobic oxidation

Effluent can be used for land irrigation. It is suitable method for small community.



Oxidation pond.

●

Chapter- 20

DISPOSAL OF DEAD BODY

There are different methods of disposal of dead body depending on community of people. Some communities follow very wild methods like offering dead body as food for animals & birds, which is followed in west Africa by tribes of Wanyam wesis.

Tribal people of Kenya threw it into the sea. Parsis in India used to keep dead body over pillar built for the purpose (sthūpa). Egyptians build pyramids along with the dead person's favourite articles.

But most of people dispose dead body by 2 important means.

1. Burning/cremation.
2. Burial.

Burning/cremation

It is again of two types.

1. Traditional method 2. Electric cremation.

Traditional method

In India most of the Hindus follow this method. In many places crematoriums are present on the banks of the rivers or the place away from community, especially outside the city.

Method

Wooden planks are placed one above the other approximately up to 2-3 ft height. Over that dead body is placed, over that again wooden pieces are placed to the height of 1 ft. length and breadth should be 7-8 ft. by 4 ft. respectively. After kindling of fire, it takes about 8 hours for complete burning.

Special care should be taken in case of death due to communicable disease. In this case dead body should be wrapped with cloth dipped in disinfectant.

Crematorium

1. It should be situated outside the city in an isolated and calm place.

2. Office should have a register to record the name, age, sex, cause of death, place of death, if hospital death then name of the hospital, date and time of death of the person.

3. It should have the materials required for cremation.

4. An assistant for the work is necessary.

Advantages

1. Less place is required.

2. Burning destroys infectious agents, if death is due to communicable disease.

3. It can be adopted in any place including villages.

4. It is ideal & fastest method of disposal of dead body.

Disadvantages

1. Consumption of fuel is more. 3. Takes 3 hours for burning.

2. Causes environment pollution.

Electric cremation

Electric furnace is used for the purpose of cremation. This is commonly found in big cities, where facility of electric furnace & electricity is present.

Parts

1. Furnace

2. Electricity conducting coils, which conduct high voltage current.

3. Special iron chambers, which prevent transmission of heat to exterior.

Chamber– It is made of iron, having semicircular entrance, through which only one body can pass through. The body rests on brick stage.

The coil is heated to red hot & turns the body into ashes in about 2-3 hours. Ash can be collected from outside.

Advantages

1. Consumes less time & space.

2. Prevents air pollution & bad odour.

Disadvantages

1. It is expensive 2. Electric furnace & electricity are necessary

3. It is not suitable for villages.

Earth Burial

In India Christians, Muslims and some Hindus adopt this method. Christians keep the dead body in the coffins, Muslims bury without coffin. Dead body gets decomposed by the action of microbes. The mud which contains more moisture is not suitable for the purpose. The place should be firm.

Dimensions– 3-5 ft deep
4 ft broad.
6-6$^1/_2$ ft long pit is dug.

- If body is buried very deep, there is hinderence for the action of microorganisms, which help in decomposition of the body.
- If depth is lesser than 3 feet some cornivores like dog, fox & jackal may take it out and cause inconvenience, which may lead to bad odour due to decomposition or spread of infectious disease to nearby residants. To prevent it, tombs are built. But it delays decomposition. It takes about 1 year for decomposition of buried bodies.

Dead body kept in coffin takes longer period for decomposition. It also depends on the strength of the wood.

Disadvantages

1. Infectious disease may spread.
2. Takes long time for decomposition.
3. Requires more space & money to build tombs.
4. It is not suitable for big cities.
5. It produces soil pollution.

Advantages

1. It does not cause air pollution.
2. Saves fuel & money in simple burials.

एवं वृत्तां सवर्णां स्त्रीं द्विजातिः पूर्वमारिणीम् । दाहयेदग्निहोत्रेण यज्ञापात्रैश्च धर्मवित् ।।
भार्यायैपूर्वमारिण्यै दत्वाग्नीनंत्यकर्मणी। पुनर्दारक्रियांकुर्यात् पुनर्दानमेवच।।(मनुस्मृति५/१६७-१६८)

In case of death of lady, body should be cleaned & burnt. After cremation rituals should be performed along with offering gifts.

ऊनद्विवार्षिकं प्रेतं निद्युर्बान्धवाबहीः । आलंकृत्यशुचौ भूमावस्थी सञ्चयनादृते ।।
नास्यकार्योग्नि संस्कारो नचकार्योदकक्रिया । अरण्ये काष्ठवत्यक्त्वा क्षेपयुस्त्र्यहमेव च ।।
(मनुस्मृति ५/६८-६९)

In case of death of child below 2 years, body should be buried after decoration, in a proper place out side the city, instead of burning.

Chapter- 21

SCHOOL HEALTH

Objectives

1. Construction of schools on modern sanitary line.
2. Recruitment of medial inspector/school M.O.
3. Proper medical examination of all children.
4. To establish school health clinic.
5. To isolate infectious diseases & establish prevention centre.
6. To facilitate nutrition through midday meals.
7. To teach practice of hygiene & healthy way of living.
8. To provide special education for disabled in body or in mind.

School Building (विद्यालय भवन)

Selection of Site

It should be centrally situated, so that it is easy for students to come. It should be 60 ft away from the main road, to avoid noise. It should not be near railway track, road, factory or cinema. It should be an architectural asset. It should be raised, properly drained & not over shadowed by tree. If possible a field or public park should be adjoining to the site. The area of 1 acre for 1000 students is essential. The play ground at the rate 20 sq ft/child should be present.

Infrastructure Building

- Pavilion type, constructed like 'E' word.
- Class rooms should open at verandah provided with separate hall, which gives adequate ventilation, air & light to all rooms.
- The premise should have proper compound wall to avoid hazards. The corridors should be 6-8 ft wide with the door way opening out side, to facilitate the escape of children in case of fire accidents.
- Separate stair case should be provided for each block, which is protected in open side by the railing & winding staircase should be avoided. Fire drills should be installed at important places.

- It should be provided with pacca drain.
- Nursery & primary schools should be ideally single storied.
- 150 C. ft/pupil of area & 10-15 sq. ft/pupil, floor space should be present.
- So that 1500 Cu. ft of fresh air per head is available.
- Height of rooms should be minimum 12 ft.
- The class room should face south or south east for sunlight.
- Each room should accommodate about 25-50 students.
- Rooms should be rectangular & width 2/3rd of the length.
- Space of atleast $7\frac{1}{2}$ ft is required for the tutor.
- 1 ft gap is essential between the last bench & the wall.
- Stair case should be 4-6 ft wide.
- Floors should be made of impermeable material.
- The walls must be white coloured.

Ventilation (Arrangement of air)

Adequate ventilation prevents the chances of infection, reduces fatigue & eye strain. Provision should be there for the entry of fresh air & exit of inhaled air. The windows should be present on the opposite walls of room, to facilitate cross ventilation.

Arrangement of lighting

Natural lighting by means of large windows is essential for visual comfort. The main light should come from left side or from above to avoid shadow of the hand or the book. Extremely brilliant light should not be there.

Ideal Temperature

Wet bulb thermometer – $60\text{-}65^{0}$ F

dry bulb thermometer – $58\text{-}61^{0}$ F

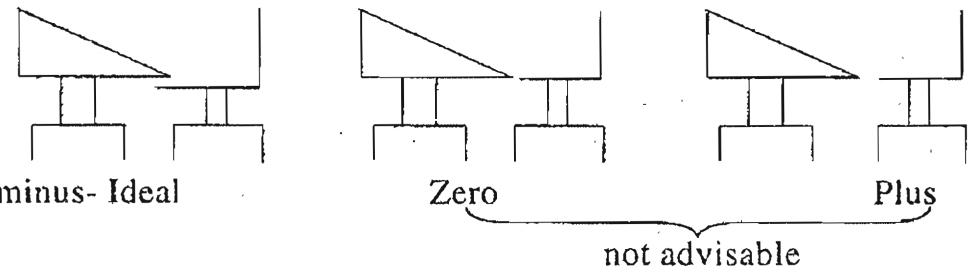
Thermometer should be present to record the room temperature.

Furnitures & fixtures

The seats & desk–

- Single seats are best.
- Seat should hold $^{2}/_{3}$ of thigh, the front edge should be rounded.

- Height should be proper, so that child rests his foot on ground.
- Proper back rest must be provided.
- Desk 15-18 inch broad & provided with slope of 15^0-45^0 for writing & reading.



The seats & the desks should be adjusted twice a year for individual student, to prevent eye strain, fatigue & risk of orthopaedic abnormality.

Black boards & maps– Boards should have dull surface. Maps should not be glazy.

Provision of meals.

Toilets– Atleast 5 closets & 5 urinals for 100 students must be present.

Drinking water supply– The supply of safe & potable water should be ensured, atleast 1 tap must be present for 100 students.

Cleaning school– At the end of the day, it should be swept and once a week furniture should be scrubbed & swept.

Health problems

Essential things for treatment for minor injury & first aid should be present in the school.

School health services

It is the most important branch of preventive medicine. It gives an opportunity for early detection & cure of disease. One medical officer for 500 children must be present. The dentists & ophthalmologists are also required.

Atleast 3 inspections during the school time should be done.

(1) Immediately after admission.

(2) Between 8 & 9 yrs.

(3) Just before leaving school.

For the children having problem, more than 3 visits may be required. It can prevent the spread of infectious diseases. Unhygienic children should be identified & advised. Children handicapped physically or mentally should be properly cared.

Immunization schedule for school children

1. • Booster dose of DT
   • TT further once in 5 year
   • Child not immunized earlier, DPT 2 doses at an interval of 2 months.
2. Tuberculosis – BCG if not given earlier.
3. Typhoid & paratyphoid group of fevers. TAB at entry & every 3 years.
4. Cholera immunization- whenever the out break occurs.
5. Poliomyelitis vaccine should be given if not given earlier.

Duties of school M.O.

1. Advice selection of site & plans for building in new schools.

2. He regularly inspects the premises, lighting, ventilation & sanitary settings etc.

3. Arranging for immunization of children against anticipated out break of communicable disease.

4. Regular disinfection of the school building.

5. Examines students & records health status.

6. Observes effects of desk & posture in children.

7. Examines every child who suffers from illhealth.

8. Instructs teacher for common ailments.

9. Training for first aid & hygiene is given.

10. Monitors the cleanliness & sanitary status of attached hostel & quality of food served.

School clinics– Methodical medical examination of children.

Special schools– For blind, hearing impaired, deaf & dumb, mentally retarded, special schools are essential.

Child guidance clinic– It should be provided with

– Child psychiatrist – Educational psychologist
– Psychiatric social worker – Psychotherapist

•

Chapter- 22

OCCUPATIONAL HEALTH HAZARDS

According to WHO occupational health aims at the promotion & maintenance of highest degree of physical, mental & social well being of workers in all occupations. The prevention among workers of departures from health, caused by their working conditions, the protection of workers in their employment from risks resulting from factors adverse to health. The placing & maintenance of workers in an occupational environment adapted to his physiological & psychological equipment & to summerise the adaptation of work to man & of each man to his job.

Aims– 1. Health promotion 2. Specific protection

3. Early diagnosis & treatment

4. Disability limitation & rehabilitation

Ergonomics is a Greek word 'Ergon' means work & nomos means law, meaning "fitting the job to the worker".

Object– "To achieve the best mutual adjustment of man & his work for the enhancement of human efficiency & well being".

Occupational environment conditions

All the external conditions & influences, which is present at the work place & which influence the health of working personnel is occupational environment. Man interacts with physical, chemical & biological agent, machine & other men.

1. Man & physical, chemical & biological environment

Physical– Heat, cold, humidity, air movement, heat radiation, light, noise, vibrations, ionising radiation, etc factors act in different ways, singly & in different combinations.

Chemical– These include large number of chemicals, toxic dusts & gases, which are hazardous to the health of workers.

Biological– Workers may come in contact to viral, rickettsial, bacterial & parasitic agents, due to close contact with animals or their products, contaminated water, soil & food.

2. Machines

Unguarded machines, projecting & moving parts, poor setup of the plant and lack of safety measures are the cause of accidents, in industry. Working in improper conditions like posture is the cause for fatigue, backache, disease of joints & muscles & impairment of the worker's health & efficiency.

3. Other man

Various psychological factors at work place–

- Collegues
- Higher authority
- Type, pace & rhythm of work
- Work stability
- Service condition
- Job satisfaction
- Security for employee
- Communications
- System of payments
- Welfare conditions
- Degree of responsibility
- Trade union activities
- Incentives

Occupational hazards and their prevention & treatment

Industrial workers are exposed to 5 types of hazards.

1. Physical hazards
2. Chemical hazards
3. Biological hazards
4. Mechanical hazards
5. Psychological hazards

Physical Hazards & Management

1. Excessive Heat & Cold

Heat
- Direct effect
- Indirect effect
- Radiant effect

(a) Direct effect– Burns, heat exhaustion, heat stroke & heat cramps are effects of direct heat.

(b) Indirect effect– Decreased efficiency, increased fatigue, enhanced accident rates are the effects of indirect heat.

(c) Radiant heat– Local hot spots like ovens, furnaces, foundry, glass & steel industries.

Heat stagnation is principal problem in jute & cotton industry.

Kolar gold mines (11000 ft below) II deepest mine in the world, where temperature of 65^{0}F is recorded at work. Working is stressful, impairs health & efficiency of workers. Effective temperature of 69-80^{0}F is comfort zone in India.

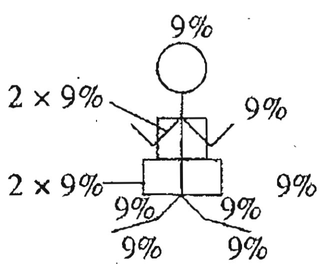
Cold work leads to
- Chill blains
- Erythrocyanosis
- Immersion foot
- Frost bite due to cutaneous vasoconstriction
- General hypothermia

Classification of Burns
- Superficial burns
- Deep burns
- Scalds

Burns– Immediate care should be taken with respect to following factors.

- Airway
- Breathing
- Circulation

Assessment of burns area– Rule of 9



Treatment principles include following factors

A – Airway maintenance

B – Breathing & ventilation

C – Circulation

D – Disability & neurological status

E – Exposure & environment control - Keep warm

F – Fluid resuscitation

Heat stroke– excessive in higher than normal heat & humidity.

Features– Increase in body temperature, headache, vertigo, confusion, hot dry skin, severe case collapse & coma to tachycardia.

Chilblains– Erythema, itching, burning especially of dorsa of fingers, toes, heels, nose, ears on exposure to extreme cold (usually associated with high humidity). Lesions can be single or multiple & can become blistered & ulcerated.

Erythrocyanosis– Limbs are swollen and red due to direct exposure to cold.

Frost bite– Erythema & slight pain are features. In severe case– painless, paraesthetic parts, result in deep seated destruction, gangrene & blistering may occur.

(2) Excessive Light

1. Poor illumination
2. Excessive illumination

Acute effects of poor illumination are eye strain, headache, eye pain, lacrymation, congestion around cornea & eye fatigue.

Chronic effect is Miners nystagmus

Exposure to excessive brightness– Discomfort, annoyance, visual fatigue and blurring of vision may lead to accidents. Ideal is sufficient & suitable lighting either natural or artificial.

Recommended illumination.

Casual leading	100 lux
General office work	400 lux
Fine assembly	900 lux
Very severe task	1300-2000 lux
Water making	2000-3000 lux

(3) Excessive Noise

(a) Auditory effects –temporary hearing loss 4000-6000 Hz
–permanent 100 decibels.

(b) Non auditory effects – nervousness, fatigue, interference with communication by speech, decreased efficiency & annoyance.

(4) Exposure to Vibration

Frequency range – 10-500Hz, when working with tools like drill, hammers etc, vibration generally effects hands & arms.

After months & years of exposure, fine blood vessels of fingers may become increasingly sensitive to spasm, injuries to joints of fingers, hands, elbows & shoulders may occur.

(5) Exposure to Ultra violet radiation

Arc welding effects the eyes and leads to intense conjunctivitis & Keratitis (welders flash), symptoms are redness of eye & pain.

Symptoms disappear after few days with no permanent change.

(6) Exposure to ionising radiation

X-rays, radioactive isotopes like cobalt 60, phosphorous 32 produce genetic changes, malformations, cancer, leukemia, ulceration, sterility & death in extreme cases.

Chemical hazards and management

Action — Local
— Inhalation
— Ingestion

Ill effects depend on duration of exposure, amount & individual susceptibility.

1. Local effects– Dermatitis, eczema, ulcer & even cancer.

- Dermatitis due to allergy – machine oils, rubber, X-ray, caustic alkalies, lime etc.
- Aromatic nitro & amino-compounds such as TNT & aniline are absorbed through skin & cause systemic effects.

2. Inhalation — dusts
— gases
— metals & their compounds

(i) Fine dust– Fine solid particles 0.1-150 microns released by crushing, grinding, abreding, loading & un loading operations, in mines, pottery, textile, wood & stone working

Classification–

Dust — Settle down – 10 micron size
— Respirable dust – suspended in air – less than 5 micron

- Organic dust – cotton, jute
- Inorganic dust – Silica, mica, coal, asbestos

- Soluble dust – dissolve slowly, enter systemic circulation
- Insoluble dust– remain in lungs permanently.

↓

pneumoconiosis, silicosis, anthracosis

(ii) Toxic gases

Simple gases – O_2, H_2
Asphyxiating gases – CO, SO_2, Cl_2, Cyanide gas
Anaesthetic – Chloroform, ether, trichloro ethane

(iii) Heavy metals & their compounds– Toxic effects of lead, antimony, arsenic, beryllium, cadmium, cobalt, manganese, mercury, phosphorous, chromium, zinc & others are manifested.

3. Ingestion of toxic metals– Lead, Mercury, Arsenic, Zinc, Chromium, Cadmium, Phosphorous etc are swallowed through contaminated hand, food & cigar. Major part is eliminated through faeces and small part enters the blood.

Biological hazards & diseases produced

Workers exposed to infective & parasitic agents may suffer from infectious diseases like brucellosis, leptospirosis, anthrax, hydatidosis, psittacosis, tetanus, encephalitis, fungal infestations, schistosomiasis & other hosts. Persons working with animal products like hair, wool, hides, skin, agricultural workers are exposed to biological hazards.

Mechanical hazards

10% accidents are due to mechanical causes.

Psychological hazards & diseases produced

- Psychological & behavioral changes
- Psychosomatic illhealth

Hostility, agressiveness, anxiety, depression, tiredness, alcoholism, drug abuse & sickness absenteeism are the psychological effects.

It also results in psychosomatic diseases like fatigue, headache, pain in shoulder, neck & back, peptic ulcers, heart disease & rapid ageing.

Measures of Health Protection in Industrial Units

- Proper Nutrition
- Communicable disease control
- Environment sanitation
- Mental health promotion
- Health education
- Protective measures for women & children
- Family planning

Prevention of occupational hazards

Levels of prevention
- Medical
- Engineering
- Legislation

Medical level

- Prior placement examination
- Periodical check ups
- Medical & health care facilities
- Notification & record maintenance
- Supervision of work environment & protective measures
- Maintenance & analysis of records along with planning strategy
- Health education & councilling

Engineering level

- Design of building
- Hygienic measures like washing, hygiene etc
- General ventilation, exhaust ventilation
- Mechanisation to prevent contact with harmful chemicals
- Substitution for manufacture of less harmful substance.
- Dust control by water spraying, hydroblasting etc
- Enclosure by shielding with protective coverages
- Isolation of some risky operations
- Protective devices like masks, shields, aprons etc to prevent damage
- Environment monitoring, toxic substances should be below maximum permissible limits
- Research- Longitudinal studies should be conducted about the health of the workers.

Legislation & Acts

Factories act 1948

Employees state insurance act 1948.

The factories Act-1948

It dates back to 1881 with latest amendment 1987

(1) Scope–

10 or more workers are workings in a place, where power used is called as factory.

20 or more workers are working in a place, where no power is used is called as factory. There is no difference between perennial factory & seasonal factory.

(2) Health, safety & welfare– Here cleanliness, lighting, ventilation are considered.

Lifts carried by men, women, children } different

Safety officer is appointed for every 1000 or more worker.

Canteen should be present where 250 workers are working

One welfare officer for 500 or more workers is essential.

(3) children below 14 yrs are prohibited.

Adolescents – 15-18 yrs can work after surgeon certifies & he cannot do dangerous works.

(4) Work hours → man – 48 hrs/week

→ man – 9 hrs/day

→ rest of $^1/_2$ hrs after 5 hrs work

Adolescent – $4^1/_2$-5 hr/day

(5) Leave with wages–

Adult → one day for 20 days of work, 30 days (maximum)

Children → one day for 15 days of work, 40 days (maximum)

(6) Occupational disease should be notified.

(7) Employment hazard should be considered.

The employees state insurance Act 1948

ESI-1948 (Amendment 1975, 1984, 1989). It provides both medical & sickness benefits along with maternal benefit, disablement benefit, rehabilitation allowance & funeral charges.

1. It includes facilities like OPD services, drug supply, immunization etc with the help of Direct & Indirect pattern services.

2. Sickness benefit in the form of cash payment for 91 days or even more in sickness condition like TB, leprosy, AIDS etc.

3. Maternity benefit in the form of cash in case of pregnancy & abortion is provided.

4. In case of injury or disability payment is given periodically.

5. In case of death funeral expenses are borne by the agency.

6. On payment of Rs 10/month the member & his family get free trentment, even after retirement or disability.

Occupational hazards

Disease	Causative factor	Clinical features	Prevention & Treatment
1. Silicosis	Dust containing free silica from mining of coal, mica, gold, silver, lead, zinc, manganese etc., pottery ceramic industry, sand blasting, building work, iron & steel.	Incubation period few months – 6 years. Insidious onset. In early stages irritant cough, dyspnoea on exertion & chest pain. Advanced stages impairment of total lung capacity. Progressive disease, x-ray shows **'snow storm'** appearance of lung field. Fibrotic changes are irreversible	There is no treatment Control– (i) Control of dust by substitution enclosure, isolation, hydro-blasting, (ii) personal protection, regular health check up.
2. Anthracosis	Coal mines	Simple pneumoconiosis, Exposure of about 12 years leads to little ventilatory impairment Progressive massive fibrosis PMF - severe respiratory, disability often results in premature death.	No treatment
3. Asbestosis	Absestos a compound made of silica with magnesium, iron, calcium, sodium & aluminium, used in cement, roof tiling, fire proof textile.	Fibrosis due to mechanical irritation & is peribronchial, diffuse & basal location, sputum shows **asbestos body**. X-ray shows ground glass appearance in lower 2/3rd of lung field. Disease is progressive, dyspnoea is disproportionate to clinical signs in the lungs. Mesothelioma of pleura & peritonium, cancer of GI tract & bronchial cancer may also occur due to asbestos expsoure.	No treatment

	Disease	*Causative factor*	*Clinical features*	*Prevention & Treatment*
4.	Byssinosis	Cotton fibre, flax, hemp inhalation in cotton yarn, linen & lope making	Early stage– Occassional chest tightness,later regular chest tightness towards the end of first day of week & progressive dyspnoea, ending in chronic bronchitis & emphysema.	Prevention–exhaust hood ventilation,proper wetting, masks. treatment- Bronchodialators, check-ups.
5.	Bagassosis	Inhalation of bagasse or sugarcane dust in sugar industries or paper making **'thermactinomyces sacchari'** causes it.	Breathlessness, cough, hemoptysis, slight fever. Beginning stages acute diffuse bronchiolitis,skiagram shows **moltting in lungs** or shadows. Impairement of pulmonary function. If treated in early stages can be cured. Otherwise leads to diffuse fibrosis, emphysema & bronchiaectesis.	Prevention-wet process, enclosed apparatus, exhaust ventilation, protective masks, regular medical checkups. Keeping moisture below 20% & spray of 2% proprionic acid for bagasse.
6.	Farmer's lung	Mouldy hay or grain dust inhalation thermophylic actinomyces. **Mycropyelospora faeni**	Acute illness characterised by general respiratory symptoms, fever, chills, cough, dyspnoea without wheezing. In chronic form repeated attacks causes patchy fibrosis of lungs & corpulmonale.	
7.	Skin cancer	Coal tar, X-ray, oils & dyes, from tar distillers, oil refinaries, dye industry, road making mineral oil etc.	Non Melanoma cancer- Nodule develops with rolled margin which bleeds on slight trauma. Squamous cell carcinoma-common in hand, fore arm, face, neck, ulcerated regional lymph node.	Surgical in early stages, later chemotherapy & radiation

Disease		Causative factor	Clinical features	Prevention & Treatment
8.	Lung cancer	Gas industry, asbestos nickel, chromium, arsenic, roasting plant, radioactive substance, mining arsenic, beryllium, isopropyl oil etc.	Cough, sputum, haemoptysis, dyspnoea, wheeze, stridor, pain, pneumonitis, metabolic spread, hoarseness of voice, tracheal obstruction, dysphagia	Prevention-enclosure, masks etc. Treatment-Lobe ctomy in first stage, chemotherapy & Radiation later.
9.	Bladder cancer	Aromatic amine, dye stuff, rubber, glass & electric cable industry, β-naphthylamines benzidine, para amino dyphenyl acramine, magenta.	Painless gross or microscopic hematuria, bladder irritability flank pain, bladder mass oedema of lower limbs, weight loss, abdominal pain or bone pain in advanced stage.	Treatment-Trans urethral resection in carcinoma in situ, chemotherapy
10.	Lead poisoning (Plumbism)	Lead arsenate, lead oxide, lead carbonate, lead sulphide used in battaries, glass, ship building, printing pottery etc.	Inorganic lead–abdominal colic, constipation loss of appetite, blue line on gums, anaemia, wrist drop & foot drop Organic lead– Insomnia, head ache, mental confusion, delirium etc.	**Prevention–** substitution, isolation,exhaust ventilation, respirators, periodic check ups. **Management** saline purge & pencillamine.
11.	Mercury poisoning	Dental medicine, batteries ceramics, electroplating	Stomatitis, foetid breath, sponginess of gums, falling of teeth, anaemia, muscular tremors, paralysis.	Prevention- ventitation, enclosures, personal protection.

Disease		Causative factor	Clinical features	Prevention & Treatment
12.	Phosphourous poisoning	Manufacture of weapons, insecticides, fertilizers and rodent poisons.	Headache, loss of appetite, anaemia, dyspnoea, hepatitis, necrosis of jaw, albuminuria, bronchitis, insomnia, long bones become brittle & more prone for fracture (fragilitasossium).	Frequent mouth wash with alkaline solution. Ventilation should be proper.
13.	Arsenic poisoning	Manufacture of semiconductor, fossil fuel, burning, wood preservative, herbicides, match stick	Painful erruptions on mucous membrane, conjunctivitis, oedema of eye lids, vomiting, colic with marked diarrhoea, painful neuritis, anaemia, ecniforous eczimatous erruption on skin, local irritation around mouth, nose & armpit.	Prevention-Industrial effluents should be treated & then left. Conversion of compounds to less toxic ones. Treatment-Removal from site is necessary, gastric lavage with in 24 hours of ingestion and symptomatic treatment should be given.

Chapter- 23
IMMUNITY

Definition (निरुक्ति)

व्याधिक्षमत्वं नाम व्याधिबल निरोधकत्वम् । व्याध्युत्पादकप्रतिबंधकत्वमिति।। (च.सू.२६/१९चक्र)

Immunity is the factor, which prevents the disease or in certain cases the severity of disease. In Ayurveda it is known by different synonyms like *Ojas* (ओजस्), *Tejas* (तेजस्), *Prāṇa* (प्राण), *Bala* (बल) etc. each emphasizing the importance of immune factor in the body.

Importance of Ojas (ओजस्)

ओजस्तु तेजो धातूनां ।। (अ.हृ.११/३७)

Ojas is the essence of seven *Dhātus*. According to *Suśruta* it is one among the seats of *'Prāṇa'* i.e. life.

प्राणायतनमुत्तमं ।। (सु.सू. १५/२६)

Derangement of *Ojas* produce several diseases and even death.

Ojas (ओजस्)

Definition (निरुक्ति)

ओजस्तु तेजो धातूनां शुक्रान्तानां परं स्मृतं ।। (अ.हृ. ११/३७)

Ojas is the essence of seven *dhātus* and is responsible for the strength of an individual.

तत्र रसादीनां धातूनां यत्परं तेजस्तत्। खल्वोजस्तदेव बलमित्युच्यते स्वशास्त्रसिद्धान्तम्।।(सु.सू.१५/२५)

Ojas is the essence of *Rasādi dhātus*, that it self is synonymed as *bala* according to the principles mentioned in classics.

Features of ojas (ओजस् लक्षण)

ओजः सोमात्मकं स्निग्धं शुक्लं शीतं स्थिरम् सरम् । विविक्तं मृदु मृत्स्नं च प्राणायतनमुत्तमम्।।

(सु.सू.१५/२६)

Ojas is having mild quality like unctousness, cold, stable, spreading nature, pure, soft, slimy, white in colour & best among the seats of *Prāṇa* ie. *Prāṇāyatana*.

हृदि तिष्ठति यच्छुद्धं रक्तं ईषत् सपीतकम् । ओजः शरीरे संख्यातं तन्नाशात् विनश्यति ।।

(च.सू.१७/७४)

चक्र → शुद्धमिति शुक्लं, रक्तपीतवर्ण, ईषत् इति अल्पप्रमाण i.e. अष्टबिन्दुप्रमाण.

Para ojas which is six drops in quantity resides in heart. It has reddish yellow colour, if it gets destroyed then there is destruction of whole body.

Seat– Heart

Formation of ojas (उत्पत्ति)

भ्रमरैः फलपुष्पेभ्यो यथा संभ्रियते मधु । तद्वदोजः शरीरेभ्यो गुणैः संभ्रियते नृणाम्। ।(च.सू.१७/७६)
शरीरेभ्यो इति धातुभ्यः ।। (च.पा.)

As the bees collect honey from the essence of different flowers, in the same way *ojas* is essence of all the *dhātus* from the human body.

प्रथमं जायते ह्योजः शरीरेस्मिन् शरीरिणां । सर्पिर्वर्ण मधुरसं लाजागन्धि प्रजायते ।। (च.वि.५/)

Ojas is formed first during the formation of the body which is characterised by ghee colour, smell of *lāja* & sweet taste.

ओजस्तु तेजो धातूनां ।। (अ.हृ.११/३७)

Ojas is considered to be formed as the essence of seven *dhātus*.

स्वेदोदन्तस्तथा केशस्तथैवोऽजश्च सप्ततम् (शा.)

Some opine *ojas* as excreta of *śukra*.

सारमादौ गर्भस्य यत्तत् गर्भरसाद्रसः ।। (च.सू. २०/९)

Some consider *ojas* as *upadhātu* of *śukra*.

During the union of *śukra* (male gamete), *śoṇita* (female gamete) & life, the *Garbha rasa* (Amniotic fluid) is transformed into *ojas*.

Classification of Ojas

- *Dhātu tejo rūpa ojas*
- *Śukra upadhātu ojas*
- *Śukra mala rūpa ojas*
- *Ślaiṣmika ojas*

- *Para ojas* → 8 drops in quantity
- *Apara ojas* → 1/2 añjali in quantity

Para ojas

प्राणाश्रयस्यौजसोऽष्टौ बिन्दवो हृदयाश्रयाः, एतदष्टबिन्दुकपरमोजो ज्ञेयम् ।
अष्टबिन्दुकस्य अवयवनाशेऽपि मृत्युर्भवतीति ।।
अल्पप्रमाणं तु परम् यदभिप्रेत्योक्तं हृदि तिष्ठति यच्छुद्धं ईषत् सपीतकम् ।।(च.सू.१७/७३-७५)

Para ojas is the prime *ojas*, where *Prāṇa* the life resides. It is 8 drops, present in heart, even a part of destruction of *para ojas* leads to death. It is white & yellowish red in colour. It is one among the 10 *prāṇāyatanas* or seats of life.

यदेव हि शुक्रमलरूपमोजः तदेव गर्भहृदयमनुप्रविष्ट
अष्टबिन्दुप्रमाणमार्तवानुविद्धत्वादीषद्रक्तपीतं जीवानुविद्धं जीवशोणितं उच्यते ।।
(अ.हृ. ११/३७-३८) commentary

Ojas which is excreta of *śukra* enters heart of foetus & becomes *Aṣṭabindu pramāṇa para ojas,* after being associated with *ārtava*, it attains reddish yellow colour, then gets associated with life i.e. (*jīva*) & called as *Jīva śoṇita*.

Apara ojas

अर्धाञ्जलि परिमाणं तु यदोजस्तदप्रधानं । तावच्चैव श्लैष्मिकस्योजसः प्रमाणम् ।। (शा.सं.७/)
अर्धाञ्जलि प्रमाणस्योजसो धमन्यः एव हृदयाश्रिताः स्थानं ।
तथा प्रमेहे अर्धाञ्जलिप्रमाणमोजः क्षीयते । ओजः क्षयः लक्षणमप्यर्धाञ्जलि ओजक्षय एव बोद्धव्यं ।।

Apara ojas is half *Añjali* in quantity, it is less important compared to *Para ojas*. Even *ślaiṣmika ojas* is half *añjali* in quantity. They circulate in the vessels connected with heart. In diseases such as *Prameha and ojokṣaya, apara ojas* gets vitiated. Even though other types of *ojas* are described according to different authers, clear cut picture is not given about them.

Channels carrying ojas (ओजोवहाः स्रोतस्)

तेन मूलेन महता महामूला मता दश । ओजोवहाः शरीरेस्मिन् विधम्यन्ते (विसर्पन्ते) समन्ततः ।।
(च.सू.३०/८)

Ojas circulates through out the body through *daśa dhamani* ie. ten main blood vessels.

Relation between ojas & bala

प्राकृतस्तु बलं श्लेष्मा विकृतो मलमुच्यते । स चैवौजः स्मृतः काये ।। (च.सू. १७/११७)

Śleṣma in the normalcy gives strength to the body & known as *'bala'*. In abnormal state it is like *mala* i.e. excreta, which should be expelled out of the body. This *bala* it self is considered as *"ojas"*.

If we consider *Āśrayāśrayī bhāva sambandha śleṣma* is residing in *rasa, mamsa, medas, majjā & śukra. Ojas* is essence of seven *dhātus* which is derived from all the *dhātus*, even then *śleṣma* is major factor in formation of *ojas*. If we consider the qualities of *ojas*, most of them have *soumya guṇa* or mild qualities, which resemble *śleṣma*. *Bala* or *ojas* derives its strength from *śleṣma*.

Bala is of three types–

1. Sahaja – Natural 2. Kālaja – Dependent on time factor.
3. Yuktikṛta – by ones intelligence.

सर्वधातुस्नेहभूतस्योपचयलक्षणस्यौजसो रसवीर्यवर्णादि । गुणा न विद्यन्ते बलस्य तु भारहरणादि शक्तिगम्यस्य रसवीर्योजसो भेदः ।। (सु.सू. १५/१९ डल्हण)

Dalhaṇa in his commentary mentions a slight difference between *ojas & bala*. *Ojas* the essence of all *dhātus* is nourished by unctuousness & its *rasa* (taste), *guṇa* (quality) & *varṇa* (colour) etc. are mentioned.

Bala is gauged by capacity to do work, like carrying heavy weights & strength. Their *rasa, guṇa & vīrya* are not mentioned.

Natural strength (सहज बल)

सहजं यच्छरीर सत्वयोः प्राकृतं । प्राकृतमिति जन्मादि प्रवृत्तं धातु वृद्ध्या ।। (च.सू.११/३६)

'Bala' the strength, both mental & physical are present naturally by birth. Certain people are strong by birth due to their excellence of *dhātus*. This depends on healthiness of *śukra*, excellence of time and place.

Strength depending on time factor (कालज बल)

कालकृतमृतुबीजभागजं वयः कृतं च । ऋतुविभागजं आदावन्ते च दौर्बल्यं ।। (च.सू.११/३६)

The strength due to favourable conditions like youth, season etc. The person naturally has less strength in childhood and old age, strength increases during *visargakāla* ie period of nourishment.

Acquired strength (युक्तिकृत बल)

युक्तिकृतं पुनस्तद्यदाहारचेष्टायोगजं ।। (च.सू. ११/३६)

आहारस्य मांससर्पिरादे चेष्टायाः उचित विश्रामा व्यायामादेर्योगः योग शब्देन रसायनादि योग ।(च.पा.)

Strength acquired by the intake of diet such as flesh, ghee etc, which enhance strength, correct exercise, rest, & rejuvenating and strength enhanacing drugs.

Factors which enhance bala (बलवृद्धिकर भावाः)

बलवृद्धिकरास्त्विमे भावा भवन्ति । तद्यथा बलवत् पुरुषे देशे जन्म, बलवत् पुरुषेकाले च, सुखश्च कालयोगः, बीजक्षेत्रगुणसंपच्च, आहारसंपच्च, शरीरसंपच्च, सात्म्यसंपच्च, सत्वसंपच्च, स्वभावसिद्धिश्च, यौवनं च कर्म च संहर्षश्चेति ।। (च.शा. ६/१३)

बलवत् देश → सैन्धवाः बलवन्ताः पुरुषाः
बलवत् काल → हेमन्ते शिशिरे काले जातः
बीज, आर्तव, गर्भाशय → प्रशस्त निर्दोष
आहारसंपत् → ओजोवर्धक/बलवर्धक आहार
शरीरसंपत्
सात्म्यसंपत् सात्म्य आहार, सात्म्य विहार
स्वभावसंसिद्धि → बलजनककर्म संसिद्धि व्यायाम संहर्ष

Place where the persons are strong like *sindhu* region, season when strength is more like *Hemanta & Śiśira ṛtu*, healthy male gamete, female gamete & uterus, food which enhance strength & ojas, robust body, conducive food & regimen, strong mind, practice of

exercise, young age & action which bring about pleasentness of mind are factors which enhance strength.

Factors which help in growth of the body (शरीरवृद्धिकर भावऽ)

कार्त्स्न्येन शरीर वृद्धिकरास्त्विमे भावा भवन्ति । तद्यथा कालयोगः, स्वभावसंसिद्धिः, आहार सौष्ठवम्, अविघातश्च ।। (च.शा.६/१२)

The factors which help in the growth of body are

1. Kāla yoga → ie. youthfulness ie upto 17 years
2. Svabhavasaṁsiddhi → unknown factor (genetic factor).
3. Āhāra sausṭhava → good nutritious, energy giving and re-juvenating food.
4. Avighata → Avoiding factors causing injury like excessive exercise, excessive sexual indulgence, mental trauma etc.

बलाधिष्ठानमारोग्यं ।

Health is dependent on *bala.*

अभ्यन्तर प्राणो बलं यच्चौजो जनितम् ।

'Bala' is due to *ojas,* which is one among important seats of *'prāṇa' ie. prāṇāyatana.*

Aetiology for depletion of ojas (ओजोक्षय कारण)

अभिघातात् क्षयात् कोपात् शोकात् व्यायामात् क्षुधः । ओजः संक्षीयतेह्येभ्यो धातुनिग्रहण निसृतं ।।
तेजः समीरितं तस्मात् विस्रंसयति देहिनाम् ।। (सु.सू. १५/२३)
धातुग्रहणमिति धातवो गृह्यन्ते यैस्तानि धातुग्रहणानि धातुवाहीनि स्रोतांसि, तेभ्यो निसृतं निर्गतं सर्वधातुस्नेहपरम्परा रूपेण, हृदयं धातुवह स्रोतसां स्थानत्वात्, तस्मात् हृदयात् निसृतं स्रोतसो मुखैरेव, तेजः पित्तं, समीरितं सम्यक् प्रेरितं वातेन, तस्मात् हृदयात् विस्रंसयति च्यावयति । (ड)

Due to injury, depletion of *ojas,* depletion of *dhātu,* anger, sorrow, excessive exercise & hunger, when ojas i.e. *sneha rūpa* from all the *dhātus* gets dislodged from the channels carrying *ojas,* which originate from the heart. It also occurs due to the action of *pitta* & *vāyu,* when there is dislodgement of *ojas* from its seat, the heart.

व्यायामोऽनशनं चिन्ता रूक्षाल्पप्रमिताशनम् । वातातपौ भयं शोको रूक्षपानं प्रजागरः।।
कफशोणित शुक्राणां मलानां चातिवर्तनम् । कालोभूताभिघातश्च ज्ञातव्याः क्षयहेतवः ।।
(च.सू.१७/७६-७७)

प्रमिताशनम् एकरसाभ्यासः, कालोवार्धक्यमादानं, भूतोपघातः पिशाचाद्युपघातः ।। (च.पा.)

Excessive exercise, fasting, worries, dry food, less food, taking single taste, excessive wind, sun, fear, sorrow, alcohol consumption, night awakening, loss of *Kapha, Rakta* (blood), *śukra* (semen), *mala* (excreta), *kala* (time) ie. old age, *ādāna kāla* & affliction by micro-organism are causes for the depletion of *ojas.*

Vitiation of Ojas (ओजो विकृति)

1. *Ojo visraṁsa* 2. *Ojo vyāpat* 3. *Ojo kṣaya*

Ojo visraṁsa (ओजो विस्रंस)

सन्धि, विश्लेषो गात्राणां सदनं दोषच्यवनं क्रियासन्निरोधश्च विस्रंसे ।। (सु.सू.१५/२९)

विश्लेष सादौ गात्राणां दोष विस्रंसनं श्रमः । अप्राचुर्य क्रियाणां च बलविस्रंस लक्षणम्।।

(सु.सू.१५/२५)

Joints become lose, unstable, body ache, displacement of *doṣās* from their seat, tiredness & impairement in performance of action are the features of *ojovisraṁsa.*

Ojo vyāpat (ओजो व्यापत्)

गुरुत्वं स्तब्धताङ्गेषु ग्लानिर्वर्णस्य भेदनम्। तन्द्रा निद्रा वातशोफो बलव्यापदि लक्षणम्।।(सु.सू.१५/२६)

स्तब्धगुरुगात्रता वातशोफो वर्णभेदो ग्लानिस्तन्द्रा निद्रा च व्यापन्ने ।। (सु.सू. १५/२९)

Heaviness in the body, stiffness in joints, discolouration, body ache, depression, drowsiness, sleep in excess and non pitting oedema (*vātaja śopha*) are the features of *ojovyāpat.*

Ojo kṣaya (ओजो क्षय)

मूर्छा मांसक्षयो मोहः प्रलापोऽज्ञानमेव च। पूर्वोक्तानि च लिङ्गानि मरणं च बलक्षये।।(सु.सू.१५/२७)

बिभेति दुर्बलोऽभीक्ष्णो ध्यायति व्यथितेन्द्रियः। दुच्छायो दुर्मना रूक्षः क्षामश्चैवौजसः क्षये।।(च.सू.१७/७३)

दुर्मना मनोबलविहीनः ।। (च.पा.)

Unconsciousness, depletion of flesh i.e. wasting, semiconsciousness and coma are the features, ultimately may lead to death in *Ojo kshaya.*

Fear, weakness, stupor, pain in the body, discolouration of skin, reduced mental strength, dryness in body & depletion of *dhātu* are features of *ojokṣaya.*

Treatment

General line of treatment (चिकित्सा सूत्र)

दोष धातुमलक्षीणो बलक्षीणोऽपि वा नरः। स्वयोनि वर्धनं यत्तदन्नपानं प्रकांक्षति।।(सु.सू.१५/२९)

The person having depletion of *doṣās, dhātu, mala & bala* should use the food & medicine which enhances strength.

सर्वदा सर्व भावानां सामान्य वृद्धिकारणं । (च.सू. १/४४)

According to *sāmanya siddhānta,* always similar qualities increase the *dhātus* ie. drugs, diet having qualities similar to *ojas* should be used to enhance *ojas.* Drugs & diet having heavy, unctuous, stable, soft & cold quality should be given.

Factors which enhance ojas (ओजोपुष्टिकर भाव)

तन्महत् ता महामूलास्तच्चौजः परिरक्षता । परिहार्या विशेषेण मनसो दुःखहेतवः ।।
हृद्यं यत् स्यात् यदौजस्यं स्रोतसां च प्रसादनं । यत्तत् सेव्यं प्रयत्नेन प्रशमो ज्ञानमेव च।।
(च.सू.३०/१३-१५)

महामूला इति ओजोवहा धमन्यः ।। (च.पा.)

The root of channels carrying *ojas* ie. *daśa dhamanis* should be protected, specially by avoiding mental faculties like miseries, worries etc. & intake of *Hṛdya dravyas* ie. cardiotonics, which nourish channels carrying *ojas* & one should adopt and thinking needed for happiness & peace.

तत्राहिंसा प्राणवर्धनानां उत्कृष्टतमम् । तत्वावबोधो हर्षणानां वीर्यं बलवर्धनानां । (च.सू.३०/१५)

Non violence is the best in enhancing *'prāṇa'*. Philosophy is the best among factors, which give happiness & semen is the best among strength promoters.

Specific line of treatment (विशिष्ठ चिकित्सा सूत्र)

क्रियाविशेषैरिति ओजोवर्धकैस्तत् विशोधकैश्च। क्रियाविशेषैराप्यायनं वाजीकरणादिभिः।। (डल्हणः)

Treatment with drugs which enhance *ojas* & *vājīkaraṇa* drugs are essential.

जीवनीयौषध क्षीर रसाद्यस्तत्र भेषजं ।। (अ.हृ.सू. ११/४१)
रसो मांसरसः अदिग्रहणेन काकण्डात्मगुप्ताघृतादि ।। (अरुण दत्त)

According to *Vāgbhaṭa, jīvanīya gaṇa dravyas,* milk, ghee, meat juice, drugs like Mucuna monosperma, Mucuna pruriens should be used for *Ojokṣaya.*

जीवनीय गण–

जीवक, ऋषभक, मेदा, महामेदा, काकोली, क्षीरकाकोली, मुद्गपर्णि, माषपर्णि, यष्टिमधु.

बृंहणीय गण–

क्षीरिणी,राजक्षवक, अश्वगन्धा, काकोली, क्षीरकाकोली, वाट्यायनी, भद्रौदनी, भारद्वाजी, पयस्या.

बल्यगण–

ऐन्द्री, अतिरस, ऋष्यप्रोक्ता, पयस्या, अश्वगन्धा, स्थिरा, रोहिणी, बला, अतिबला, ऋषभि.

स्तन्यजनन–

वीरण, शालि, षष्ठिक, इक्षुवालिक, दर्भ, कुश, काश, गुन्द्र, इत्कट, तृणमूल.

शुक्रजनन–

जीवक, ऋषभक, काकोली, क्षीरकाकोली, मुद्गपर्णि, माषपर्णि, मेदा, वृद्धरुहा, जटिला, कुलिङ्गा.

वयस्थापन–

अमृता, अभया, धात्री, मुक्ता, श्वेत, जीवन्ति, अतिरसा, मण्डूकपर्णि, स्थिरा, पुनर्नवा.
मधुर स्निग्ध शीतानि लघूनि च हितानि च । ओजसो वर्धनान्याहु तस्मात् बालस्तथाऽश्येत् ।।
(का.सं.सू.२७/१६)

One should give conducive food which enhance ojas, having sweet, unctuous, cold & light qualities to children.

क्षीरदधिघृतमांस शालि षष्ठिक यवगोधूमानां च दिवा । स्वप्न ब्रह्मचर्य अव्यायाम बृंहणबस्त्युपयोगः ।।

Intake of milk, curds, ghee, rice or *śāli & ṣaṣṭhika* variety of rice, barley and wheat, indulgence in day sleep, abstinence, avoidence of exercise & *bṛṁhaṇa basti* (nourishing enema) enhance strength.

मांसमाहिषवाराहमाजं गुडगुरूणि च। श्लेष्मक्षीणोऽभिलषति क्षीरस्वप्न दधीनि च ।।

(स.सू. १५/३०डल्हण)

Meat of bufallo, pig, goat, jaggary, milk, curds, day sleep & drugs which are heavy should be consumed, when there is depletion of *Kapha*. Same can also be given in *Ojo kṣaya*.

ओजः शब्देन रसोऽप्युच्यते । (सु.सू. १५/१९ डल्हण)

इक्षु मांस रस मन्थ मधु सर्पि गुडोदकं। असृङ्मांसं यवागूं च रसक्षीणोऽभि वाञ्छति।।

(सु.सू.१५/३० डल्हण)

Dalhaṇa states that ojas is nothing but *rasa*. So, sugarcane, meat juice, *mantha*, honey, ghee, jaggary, water, blood, meat and *yavāgu*, which are conducive in depletion of *rasa* can also be indicated in *Ojoksaya*.

जीवशोणितमप्योजः शब्देनामनन्ति केचित् । (सु.सू. १५/१९ डल्हणा)

Dalhaṇa also considers *ojas* as blood, which is responsible for life.

द्राक्षा दाडिम युक्तानि सस्नेहलवणानि च । रक्तसिद्धानिमांसानि रक्तक्षीणोऽभिकाङ्क्षति ।।

(सु.सू.१५/३०डल्हण)

So fruits of grapes, pomegranate along with unctous substances & salt, meat prepared from blood, which are conducive in depletion of blood can also be given in *Ojo kṣaya*.

ऊष्माणमप्योजः शब्देनापराणि वदन्ति । (सु.सू. १५/१९ डल्हण)

प्राणीनां पुनर्मूलमाहारो बलवर्णोजसां च ।। (सु.सू. १)

Root cause for the strength & complexion of a person is food.

अम्लानि दधि सिद्धानि तथा षाडव खादति च । स्थूलक्रव्याद मांसानि मांसक्षीणोभिकांक्षति ।।

(सु.सू. १५/३४ डल्हण)

Ṣāḍhava a preparation made of sour items, curds, meat of cornivores are conducive for depletion of flesh. As depletion of *maṁsa* is a feature in *Ojokṣaya*, it can also be used.

Features of excellence of Ojas (ओजोपूर्ण/बलपूर्ण देह)

सममांस प्रमाणस्तु समसंहननो नरः । दृढेन्द्रिय विकाराणां न बलेनाभिभूयते ।।

क्षुत् पिपासासहः शीतव्यायामसंसहः।समपक्ता समजरः समसंहननो मतः।।(च.सू.२०/१८-१९)

The person having superior *bala* has well nourished muscles, very compact body, sturdy, sense organs devoid of any weakness, diseases never occur in severe form, he can withstand hunger, thirst, cold, exercise & he takes food in proper quantity which gets digested easily & gets absorbed to the fullest extent.

तत्र बलेन स्थिरोपचितमांसता सर्वचेष्टास्वप्रतिघातः । स्वरवर्णप्रसादो बाह्यानां च अभ्यन्तराणां करणानां आत्मकार्य प्रतिपत्तिर्भवति ।। (सु.सू. १५/२५)

The person with superior strength has robust muscles, efficient working, pleasent voice, complexion, efficient working of internal & external organs.

यच्छरीर रस स्नेहः प्राणाः यत्र प्रतिष्ठिताः । तत् फला बहुधा वा ताः फलंतीव महाफलाः।।

(च.सू.३०/१०)

Ojas is the essence of dhātus, Prāṇa resides in ojas itself. All the functions of ojas are brought into action only with the help of ten main vessels, so these vessels play vital role in the maintenance of health.

Immunity

Host defences against infection are at once local & systemic, non specific & specific & humoral & cellular.

Classification

1. Active immunity
   - → Humoral immunity
     - → Natural immunity
     - → Acquired immunity
   - → Cellular immunity
   - → Combination of the above.
2. Passive immunity
   - → Normal human Ig
   - → Specific human Ig
   - → Animal antitoxins or antisera.

Active immunity

The immunity, which develops as a result of infection or by specific immunization & is usually associated with presence of antibodies or cells having a specific action on micro organisms concerned with a particular infectious disease or its toxin is known as active immunity.

Ways of aquiring active immunity

(1) After clinical infection Ex: chicken pox, rubella, measles.

(2) After subclinical or inapparent infection Ex: polio, diphtheria

(3) After immunization Ex: DPT, BCG, TT, OPV etc.

Immune response

Primary response	**I**	**II**
	2-3 days	in few days
First adminitration of Antigen	IgM antibody rises slowly	IgG appears, reaction peak by 7-10 days.

3-10 days of latent period is present before antibody appears in the blood.

Secondary response (booster)

Antigen → IgM → brief production

IgG antibody → larger & prolonged production.

(1) Humoral immunity

The B cells (bone marrow derived lymphocytes) proliferate & manufacture specific antibodies, after antigen presentation by macrophages & produce humoral immunity. Antibodies are present in immunoglobulin fractions of serum. IgG, IgM, IgA, IgD & IgE are 5 main classes. These circulate in the body & neutralize the microbes.

(2) Cellular immunity

Even though humoral immunity work efficiently, cellular immunity is essential in cases of some pathogens like M. laprae, M. tuberculosis, S. typhoid etc. which escape bactericidal action of leucocytes. The macrophages are stimulated by lymphokines secreted by T lymphocytes.

(3) Combination of the above

In addition to the B & T lymphoid cells, they co-operate with macrophages & human K (killer) cells, which constitute complex events of immunity.

Ex: Helper T cells are essential for the proper production of antibody to most antigens.

Suppresser T cells inhibit immunoglobulin synthesis. (K)cytotoxic cells recognise membrane viral antigens through specific antibody, (NK) natural killer cells act against non specific virus infected target cells.

Advantages of active immunity

(1) The duration of protection is usually long lasting.

(2) Excluding some exceptions severe reactions are rare.

(3) The protective efficacy of active immunization is more than passive immunization. It is almost 100% in some cases.

(4) Active immunization is cheaper than passive immunization.

Passive immunization

When the antibodies produced in one body (human or animal) are transfered to another, to induce protection against disease, is known as passive immunity.

(1) Antibody containing preparation like immunoglobulin or antiserum are given.

(2) Antibodies passing across the placenta. Ex. Human milk containing protective antibodies IgA transferred to body.

(3) Passive cellular immunity induced by lymphocyte transfer is still under experiment.

Advantages– Immunity gets established quickly.

Disadvantages– 1. Immunity produced is temporary and lasts for few days to months.

2. Reticuloendothelial system is not educated.

3. It is costlier than active immunization.

Both active & passive immunization can be considered under yuktikṛta bala.

Herd immunity

The resistance of a community or group of people to a particular disease is herd immunity. It acts as an immunological barrier to the spread of disease in the human herd. If the herd immunity is high the occurrence of an epidemic is unlikely. It is achieved in case of diphtheria & poliomyelitis.

National immunization schedule

For Infants–

At birth	–	BCG & OPV – O
for institutional deliveries.		
At 6 weeks	–	BCG (if not given at birth)
	–	DPT-1, OPV-1
At 10 weeks	–	DPT-2 OPV-2
At 14 weeks	–	DPT-3 OPV-3

At 9 months	–	Measles
At 16-24 months	–	DPT & OPV
At 5-6 yr.	–	DT – second dose at 2 months interval if not previously immunized.
At 10-16 years	–	Tetanus toxoid second dose at 1 month interval, if not previously immunized.
Early pregnancy	–	TT-1, booster dose
After one month	–	TT-2

In *Āyurveda* concept of *bāla rasāyana* has been explained for the purpose of primary prevention.

Rejuvenalion of child (Bāla rasāyana)

विघृष्य धौते दृषदि प्राङ्मुखी लघुनाऽम्बुना । आमथ्य मधुसर्पिर्भ्यां लेहयेत् कनकं शिशुम् ।।
सुवर्ण प्राशनम् ह्येतन्मेधाग्निबलवर्धनम् । आयुष्यं मङ्गलं पुण्यं वृष्यं वर्ण्यं ग्रहापहम् ।।
मासात् परममेधावी व्याधिभिर्न च घृष्यते। षड्भिर्मासैः श्रुतधरः सुवर्णप्राशनाद्भवेत् ।।(का.सं.१)

Facing towards eastern direction, gold should be rubbed over the stone in the medium of water. This should be given to the infant with honey and ghee. It enhances intellect, digestive fire, strength, longevity, virility and complexion. It is auspicious and pious and thus helpful in *bāla graha*. Administration of this for one month makes the child very intelligent and free from disease. Administration for six months, enhances memory and makes him grasp every thing he listens instantaneously.

ब्राह्मी मण्डूकपर्णी च त्रिफला चित्रको वचा । शतपुष्पाशतावर्यौ दन्तीनागबला त्रिवृत् ।।
एकैकं मधुसर्पिर्भ्यां मेधाजननमभ्यसेत्। कल्याणकं पञ्चगव्यं मेध्यं ब्राह्मी घृतं तथा।। (का.सं.१)

Brāhmi (Bacopa moneiri), *Mandūka parni* (centella asiatica), *triphala, citraka* (Plumbago zeylanica), *Śatapuṣpa* (Funiculum vulgare), *Śatāvari* (Asparagus recimosa), *Dantī* (Balio spermum montanum), *Nāgabala* (sida humilis) and *Trivṛt* (operculana turpethum) can be used singly with honey and ghee, to enhance memory power or along with *medhya ghṛta* like *Kalyāṇaka, pañcagavya or brāhmi ghṛta.*

समङ्गा त्रिफला ब्राह्मी द्वे बले चित्रकस्तथा । मधु सर्पिरिति प्राश्यं मेधायुर्बल वृद्धये ।। (का.सं.१)

Saṃaṅgā (Rubia cardifolia), *Triphala, Brāhmi* (Bacopa moneiri), *Bala* (Sida cardifolia), *Atibala* (Abitulon indicum) and *Citraka* (Pumbago zeylanica) singly with honey & ghee also enhance intelligence, longevity and strength.

●

Chapter- 24

INFECTIOUS DISEASES

Janapadodhvaṁsa

The word *Janapadodhvaṁsa* comprises of two words, *'Janapada'*- large population & *'Udhvaṁsa* or destruction. The disease which produces destruction of large population.

Causes for diseases

द्विविधो हेतुर्व्याधिजनकः प्राणिनां भवति-साधारणः असाधारणश्च । तत्रासाधारणं प्रतिपुरुष नियतं वातादिजनकमाहाराद्यभिधाय, बहुजनसाधारणं वातजलदेशकालरूपं साधारणरोगकारण मभिधातं जनपदोध्वंसनीयोऽभिधीयते ।। (च.पा. on च.वि. ३/२)

The causes of disease is mainly *Asādhāraṇa* ie individual factors & *sādhāraṇa* or factors relating to community like vitiation of water, air, land & seasons. In this the *sādhāraṇa hetus* related to community are emphasised.

Factors responsible for epidemics (जनपदोध्वंसकराः भावाः)

ते तु खल्विमे भावाः सामान्या जनपदेषु भवन्ति; तद्यथा वायुः उदकं देशः काल इति।।(च.वि.३/६)

Factors which are common to the population under a particular community are air, water, land & seasons. Sinful acts or *Adharma* in the form of war, (*śastraprabhāva*), affliction by attacks of *Rākṣasas* & curse (*Abhiśāpa*) lead to *Janapadodhvaṁsa.*

Root cause for epidemics (जनपदोध्वंस मूल)

Root cause for vitiation of air etc factors is *'adharma'* or misdeeds of past performed by intellectual errors. Sinful acts may be in the form of wars, demons, germs & curse.

In the present day sinful act can be correlated to different activities like antinational elements indulging in bomb blast, crime, deforestation, not obeying government rules in the industries, discharge of untreated polluted water in to the river, automobile pollutions etc, which produce air pollution. Disposal of waste water in an improper method on land leads to pollution of soil. The basic cause as mentioned earler is intellectual errors (*Prajñāparādha*), due to *rajas & tamas* predominance resulting in greed, selfishness, tendency to harm people, jelousy & anger. All these fac-

tors not only influence the individual, but also the society leading to *Janapadodhvāṁsa*.

Characters of vitiation of air, water, land & time have been dealt in detail under chapter of air, water, land & seasonal regimen.

Classification

1. Inavitable factors 2. Evitable factors

Inavitable factors– Influence of stars, planets, moon, sun, air, fire & directions results in irregularity in seasons. This results in altered taste, potency, *vipāka* & other qualities of drugs, which lead to development of various diseases.

वाताज्जलं जलाद्देशं देशात् कालं स्वभावतः। विद्याद्दुष्परिहार्यत्वाद्गरीयस्तरमर्थवित्॥ (च.वि. ३/१०)

Naturally, vitiation of season is most difficult to rectify. Similarly vitiated air, water & land are progressively difficult to purify.

कालस्तु सर्वथा त्यक्तुमशक्ता इति सर्वेष्वेव गरीयान्॥ (च.वि.३/१०)

Season is impossible to rectify as vitiation is due to the influence of inevitable factors like stars, planets, moon, sun, air etc.

Principles of treatment of Janapadodhvaṁsa

1. Avoid sinful acts & intelleutual errors.

2. *Rasāyana prayoga* or Rejuvenation to enhance immunity or immunization in modern to prevent them.

3. Truthfulness, kindness, generosity, worshipping god, codes of conduct & auspicious rituals help to prevent diseases.

4. In the present scenario following rules & regulation laid by Government, not involving with antisocial elements & activities which destroy the society. In other words enhancing *satva guṇa* leads to prevention of *Janapadodhvaṁsa.*

5. Relief operations during natural calamities like floods, cyclones, land slides, earthquakes in the from of supply of food, medicine, cloth shelter etc are needed.

6. For the prevention of *Janapadodhvaṁsa* in the form of pollution of air, water, land & season, the strict implementation of legislation is necessary. Department of Health & family welfare has a key role in prevention.

Definitions of infectious diseases

Epidemic

'Epi' means 'upon', 'demos' means 'people'. The 'unusual' occurrence in a community or region of a disease, specific health re-

lated behavior (Ex: smoking) or other health related events (Ex: traffic accidents) clearly in excess of 'expected occurrence'.

Endemic

'En' means 'in', 'Demos' means 'people'. It is the constant presence of a disease or infectious agent with in a given geographic region or population without being brought from outside.

Hyperendemic– Constant high incidence of a disease in an area.

Holoendemic a high level of an infectious disease, in an early stage of life and affecting most of child population, where in children are affected more than adults is holoendemic.

Sporadic– The diseases occur irregularly, haphazardly and infrequently in a particular place at given period.

Pandemic– An epidemic usually affecting a large proportion of population, occurring over a vast geographic area, such as a part of nation, whole nation or continent Ex: influenza pandemics of 1918 & 1957.

Communicable diseases can be classified under *Adhidaivika*, *Daivabala pravṛtta* disease according to *suśruta*.

दैवबलप्रवृत्ता ये देवद्रोहादभिशप्तका अथर्वणकृता उपसर्गजाश्च तेऽपि द्विविधा: विद्युदशनिकृताश्च पिशाचादि कृताश्च पुनश्च द्विविधा: संसर्गजा, आकस्मिकाश्च ।। (सु.सू. २४/७)

Daivabala Pravṛtta are caused by disrespecting god, preceptors, *brahmin* etc, curse of preceptor, or hymns and by the association with the patient suffering from infectious disease. These are again of two types ie by lightening & demons, ghosts etc. these are correlated for micro organisms. They are classified as communicable & accidental.

Saṁsargaja disease (संसर्गज व्याधि)

अत्र संसर्गजा औपसर्गिक रोगिसंसर्गजाता: ।। (डल्हण on सु.सू.२४/७)

The disease produced by the contact of patients suffering from infectious disease.

Contagious disease

A disease that is produced due to direct contact with skin or mucous membrane. Ex: Scabies, trachoma, STD, leprosy, ringworm etc.

Upasargaja vyādhi (उपसर्गज व्याधि)

उपसर्गजा इति उपसृज्यन्त इत्युसपर्गा: पीडितजनसमीपोत्पन्ना ज्वरादय: ।।(डल्हण on सु.सू.२४/७)

The close contact with the patient suffering from fever etc diseases produce *upasargaja vyādhi.*

केचित् उपसर्गाभिशापाभिचाराभिषङ्गजा इति ।। (डल्हण on सु.सू. २४/७)

Some others opine that, they are due to curse, actions and contact with infected persons.

Infectious disease

A clinically manifested disease of man or animals resulting in the spread to another person or animal is an infectious disease.

Infections

The entry and development or multiplication of an infectious organism in the body of man or animals is infection.

Stages of infection

1. Colonization Ex: S. aureus in skin and normal nasopharynx
2. Sub clinical or inapparent infection Ex: Polio, HBV
3. Latent infection Ex: virus of herpes simplex
4. Manifest or clinical infection Ex: Measles, Malaria etc.

Contamination

The presence of an infectious agent on a body surface, also on cloths, beddings, toys, surgical instruments or dressings or other inanimate articles or substances including water, milk, & food.

Infestation

Lodgement, development & multiplication of arthropods on the surface of the body or cloth is known as infestation. Ex: lice, itch mite.

Host

A person or other animal including birds & arthropods that provide site & shelter to an infectious agent under natural conditions is host.

1. Obligate host– is the only host Ex: man in measles or typhoid.

2. Definitive host– Host in which parasite becomes mature or passes to sexual form is definitive or primary host.

3. Intermediate/secondary host– Host in which parasite is in larval stage or asexual state.

Communicable disease

A disease produced due to specific infectious agent or its toxic products, capable of being directly or indirectly spread from man to man, animal to animal or from environment to man or animals.

प्रसंगात् गात्रसंस्पर्शात् निःश्वासात् सहभोजनात् । सहशय्यासनाच्चापि वस्त्रमाल्यानुलेपनात् ।।
कुष्ठ ज्वरश्च शोषश्च नेत्राभिष्यन्द एव च । औपसर्गिकरोगाच्च संक्रामन्ति नरान्नरं ।।

(सु.सू.५/३३-३४)

The concept of communicable disease along with the mode of spread has been explained in *Suśruta samhita. Aupasargika diseases* like obstinate skin diseases including leprosy, fever, emaciation & conjunctivitis, spread from person to person by contact, touch, respiration, sharing food, sharing bed & seats, using cloths, garlands & unctions used by the person suffering from *aupasargika* diseases.

Exotic– Diseases which are imported into a country in which they do not otherwise occur Ex: rabies in UK.

Zoonosis– An infection or infectious disease which spreads under natural circumstances from vertibrate animals to man. This is again sub classified into.

1. Anthropozoonoses– Infections spread from vertibrate animals to man Ex: Rabies, plague, hydatid disease etc.

2. Zooanthroponoses– Infections spread from man to vertibrate animals Ex: human tuberculosis in cattle.

3. Amphixenoses– Infections present in both man & lower vertebrate animals that may be transmitted in both directions Ex: T. cruzi, S. japonicum.

Epizootic– Epidemic occuring in an animal population Ex: Anthrax, brucellosis, rabies.

Epornithic– Epidemic occuring in a bird population.

Enzootic– An endemic occuring in animals. Ex: Anthrax, rabies, brucellosis.

Nosocomial infection

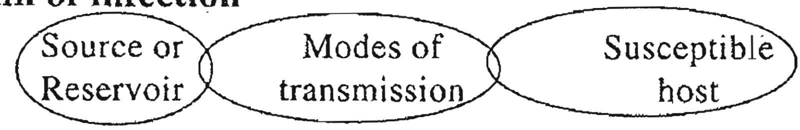
A new infection contracted by a patient, while in a hospital or other health care facility Ex: Hepatitis B, UTI, HIV.

Opportunistic infection

This is infection by an organism that takes opportunity of immunity defect in host to infect host & hence cause disease. Ex: Herpes simplex, Cytomegalovirus, Toxoplasma, M. tuberculosis.

Mechanism of disease transmission

Chain of infection



Source & reservoir of infection

The source of infection is defined as "the person, animal object or substance from which an infectious agent passes or is disseminated to the host".

A reservoir is defined as "any person, animal, arthropod, plant, soil or substance in which an infectious agent lives and multiplies, on which it depends primarily for survival & where it reproduces itself in such manner that it can be transmitted to a susceptible host".

Types of reservoir of infection

1. Human reservoir of infection 2. Animal reservoir of infection
3. Reservoir of infection in nonliving things.

1. Human reservoir of infection

Man is the most important source or reservoir of infection for humans, either in the form of case or carrier.

Cases
- Clinical
  - mild
  - moderate
    - Typical
    - Atypical
  - severe/fatal
- Subclinical
- Latent infection

A case is defined as a person in the population or study group identified as having particular disease, health disorder or condition under investigation.

Clinical illness of mild variety & subclinical cases with inapparent symptoms are usually missed. They play important role in maintaining the chain of infection. In diseases like rubella, mumps, polio, hepatitis A & B, Japanese encephalitis, influenza & diphtheria, subclinical cases are common.

In latent infection the host does not shed infectious agent. It lies dormant without symptoms in the host. Ex: herpes simplex.

Primary case is the first case of communicable disease occuring in the population unit being studied.

The term **index case** is the first case to come to the notice of the investigator.

Infection carriers

A carrier is defined as "an infected person or animal that harbours a specific infectious agent in the absence of discernible clinical disease & serves as a potent source of infection for others".

They are more dangerous as they can not be recognized, as they appear normal.

Carriers

A. Depending on type
- Incubatory Ex: measles, mumps, polio, pertusis etc.
- Convalescent Ex: Typhoid, dysentry, cholera, diphtheria, pertusis
- Healthy Ex: poliomyelitis, cholera, diphtheria, salmonellosis

B. Depending on duration
- Temporary
- Chronic

C. Depending on Portal of exit
- Urinary
- Intestinal
- Respiratory
- Others

Incubatory carriers & convalescent carriers are in the particular phase of a disease & Healthy carriers comprise of subclinical cases, who have developed carrier state without suffering from disease, but shed the causative agent.

Temporary carriers shed the infectious agent for time period, which may include incubatory, convalescent & healthy carriers.

Chronic carriers shed infectious agent for indefinite time. Ex: Typhoid, hepatitis B, dysentry, cerebro spinal meningitis, malaria, gonorrhoea etc.

2. Animal reservoir of infection

The diseases & infections which spread to man from vertibrates is called zoonoses. Ex: Rabies, yellow fever, influenza. They may be cases or carriers.

3. Reservoir of infection in non living things

Soil & non living things can act as reservoirs of infection Ex: soil may be source for tetanus, anthrax,

Modes of spread

Communicable disease may spread from the reservoir to the susceptible host in many ways.

Modes of spread of infectious disease
- Direct spread
  - Direct contact
  - Droplet infection
  - Contact with soil
  - Inoculation into skin or mucosa
  - Transplacental or vertical
- Indirect spread
  - Carried by Vehicle
  - Carried byVector
    - Mechanical
    - Biological
  - Carried by Air
    - Droplet nuclei
    - Dust
  - Carried by Fomite
  - Contaminated hands & fingers.

Direct spread

1. Spread through direct contact

Infection spread by direct contact from skin to skin, mucosa to skin or mucosa to mucosa of same or another person Ex: STD, AIDS, leprosy, leptospirosis, skin & eye infection.

2. Spread through droplet infection

Dispersion of droplets of saliva & nasopharyngeal secretions, as in coughing, sneezing, speaking & spitting. In infectious diseases droplets contain millions of bacteria & virus. Ex: respiratory tract infections, chicken pox, diphtheria, pertusis etc.

3. Spread through contact with soil

Infection occurs due to direct contact with part & soil, compost or wrotten vegetable. Ex: hookworm larvae, tetanus, mycosis.

4. Spread through inoculation into skin or mucosa

Infectious agent may be directly injected into skin or mucosa, as in dog bite leads to rabies, infected needles & syringes lead to Hepatitis B, HIV etc.

5. Spread through transplacental or vertical mode

Infectious agents spread through placenta to the foetus.

Ex: TORCH (Toxoplasma gandii, rubella, cytomegalovirus, Herpes virus), syphilis, Hepatitis B, HIV.

Indirect spread

The spread mainly takes place by 5 Fs, flies, fingers, fomites, food & fluid.

(1) Carried by vehicle– Infection is spread by means of vehicles like water, food, ice, blood, serum, plasma, biological products. Ex: Acute diarrhoea, food poisoning, poliomyelitis, typhoid etc.

(2) Carried by vector– Arthropod or any living carrier carries the infectious organisms. Ex: malaria, filaria, dengue, mice, rodents, fleas etc.

(3) Carried by air– Droplet nuclei are types of particles responsible for the spread of air borne infections, which are of size of 1-10 microns & dried residue of droplets, dust, larger droplets expelled may settle down on floor & become a part of environment. Ex: tuberculosis, pneumonia, Q fever etc.

(4) Carried by fomite– Fomites are nonliving articles, excluding water & food contaminated by infectious discharges from a patient & have the capacity to harbour & transfer the infectious agent to a healthy person. Ex: clothes, towels, kerchiefs, cups etc.

(5) Contaminated hands & fingers– Frequently soiled hands act as a means for the transfer of agents to food from skin, nose, bowel etc. Ex: staphylococcal & streptococcal infection, typhoid, dysentery, amoebiasis.

Susceptible host

"A person or other animal including birds & arthropods, that gives shelter or place to an infectious agent under natural conditions" is a host.

Incubation period

"The time interval between the attack of an infectious agent & appearance of the first sign or symptom of the disease" is incubation period.

Generation time

"The interval of time between contract of infection by a host & maximal infectivity of the host" is generation time.

Communicable period

The time during which an infectious agent may spread directly or indirectly from an infected person to another person, from an infected animal to man or from an infected person to an animal including arthropods.

Secondary attack rate

The number of exposed persons developing the disease with in the incubation period after exposure to the primary case.

Disease prevention & control

Three main measures are adopted for prevention of infectious disease.

1. Controlling reservoir or source of infection
2. Interruption in the routes of transmission
3. Immunizing the susceptible host.

Early diagnosis, notification, epidemiological investigations, isolation, treatment, quarantine, hygiene & immunization help in the process of control & prevention of diseases.

Notification of infection (विज्ञाप्ति)

After the detection of infectious disease, it has to be notified to local health authority, who is responsible for taking control measures & treatment of patients & hospitalization when necessary.

Notifiable diseases differ from country to country. The diseases which cause serious implications in public health, will be considered under this.

Diseases to be notified by national health authority to WHO

(1) Those diseases subject to International Health Regulations (1969). Third annolated Edition 1983.

– Cholera, plague, & yellow fever.

(2) Diseases under surviellence by WHO – louse borne typhus fever, relapsing fever, paralytic polio, malaria, viral influenza, etc.

Importance of Notification

(1) It is important source of epidemiological information.

(2) It helps in early detection of disease out break.

(3) It enables to implement immediate actions.

Limitations

(1) Notification includes only a small part of total sickness in the community.

(2) One of important disadvantages is under reporting.

(3) The cases which are atypical & subclinical escape notification. Ex: Rubella, nonparalytic polio.

Isolation (पृथक्करण)

It is one of the oldest measure of communicable disease control. Isolation is defined as "separation for the period of communicability of infected persons or animals from others in such places & under such conditions as to prevent or limit the direct & indirect transmission of infectious agent from those infected to those who are susceptible or who may spread the agent to others".

Types of isolation

1. Standard isolation
2. Strict isolation
3. Protective isolation
4. High security isolation
5. Hospital isolation
6. Home isolation
7. Ring immunization Encircling of the persons, who are immune for the infection from which the person is suffering is also a type of isolation.

Isolation can be effectively used in case of Cholera, diphtheria, streptococcal respiratory disease, pneumonic plague etc.

In case of subclinical infections & carrier state, it is difficult to implement. Ex: Polio, Hepatitis A, typhoid. Control of diseases like leprosy, tuberculosis & STDs by isolation is not possible. Most of the times case will be reported after it has spread to others.

Barrier approach to the prevention & control of infectious disease is not successful as it gives the feeling of false security.

Quarantine

It is defined as "the limitation or restrition of movements of such healthy persons or domestic animals exposed to communica-

ble disease for a period of time, not longer than longest incubation period of the disease in such manner as to prevent effective contact with those who are not exposed".

Types

(1) Absolute quarantine– as defined above.

(2) Modified quarantine– Partial limitation such as exclusion of children from school.

(3) Segregation– Separation for special consideration, control or observation of some part of a group of persons from the other to facilitate the control of communicable disease.

It is applied by Health authority of ships, aircraft, train, road vehicle, other means of transport or container to prevent the spread of diseases reservoir of disease or vectors of disease.

Disinfection of Hospitals (आतुरालय विसंक्रमण)

Disinfection

Disinfection of specific organisms of infectious diseases. **Disinfectant** or **germicide** is a substance, which kills harmful micro organisms (not usually spores) with object of preventing spread of disease. **Antiseptic** is a substance, which kills or inhibits the growth of microorganisms. They are useful for application on living tissue. A disinfectant in low concentrations can act as an antiseptic if needed. A **deoderant** is a substance which supresses or neutralises the bad odours Ex: lime, bleaching powder. **Detergent** is a surface cleaning agent which acts by lowering surface tension Ex: soaps which remove bacteria along with dirt.

Sterilization is the process of destroying all life including spores. **Disinfection** is destruction of infectious agents outside the body by direct exposure to physical or chemical agents to prevent the spread of infectious disease.

Types of disinfection

(1) Concurrent disinfection (2) Terminal disinfection

(3) Precurrent disinfection

In **Concurrent disinfection** the disease agent is destroyed as soon as it is released from the body and in this way further spread is prevented. Usually urine, faeces, vomitus, clothes, gloves, dressings, aprons etc. throughout the period of ill health.

In **Terminal disinfection** after the patient has been removed by death, or to a hospital or no more a source of infection. It is rarely in practice.

Precurrent disinfection is used as a prophylactic measure. Ex: water by chlorination, pasteurization of milk.

Classification

Natural	– Sunlight, Air	
Physical	– Burning	Dry heat
	– Hot dry air	
	– Boiling	Wet heat
	– Steam	
	– Radiation	
Chemical	– Phenols and related compounds	
	– Quarternary ammonia compounds	
	– Halogens and their compounds	
	– Alcohols, Formaldehyde, Miscellaneous	

Disinfection in Āyurveda

१. वस्त्रपूर्तं जलं सूक्ष्मजन्तून् विनाशयति ॥ (मनुस्मृति)

Water filtered through fine cloth destroys micro organisms.

2. *Haṁsodaka*- Natural disinfection of water.
3. *Taila, Kṣāra & Udaka, Pāyana* are methods of the disinfection of instruments.
4. Washing of the wounds with different decoctions, which act as disinfectants.
5. Fumigation of the vessels, rooms, with the *Guggulu, Niṁba* etc antimicrobial drugs.

Natural agents

Sun light and the fresh air kill most of the germs, particularly ultra violet rays are lethal to bacteria and some virus. Articles like linen, bedding and furniture may be disinfected by this method.

By the process of dessication all micro-organisms are sooner or later attenuated in their disease producing activities. Typhoid, tuberculosis, diphtheria bacilli resist dying for long time.

- Direct sunlight can kill typhoid bacilli with in $1^1/_2$ to 2 hours, diffuse light in 5 hrs.
- Tuberculosis bacilli are killed by sunlight from few minutes to several hours, according to thickness of mass exposed.

- Tropical sunshine is rich in both above rays ie. U.V. rays, heat rays, which help in disinfection of water tanks.
- Drying inhibits the multiplication of bacilli. Oxygen in the air has toxic effect on organisms.
- Red yellow rays have less disinfecting power

  Blue, U.V & heat rays are powerful disinfectants.

Physical disinfection

Dry heat

(1) Burning– Incineration is the best method of disinfection. Priceless articles like contaminated dressings, rags, swabs, etc can be disposed by this method. Burning should not be done in open air, **'incinerator'** should be used.

(2) Hot dry air– Articles like glass ware, syringe, swabs, dressings, french chalk, oils, vaseline and sharp instruments may be disinfected by this.

Demerit– It has no penetrating power, so not suitable for bulky items. The hot air oven is used for this purpose. Temparature of 160-180^{0}C for one hour can kill the spores.

Moist heat

(1) Boiling– It is an effective method of disinfection. Boiling for 5-10 minutes kills bacteria not spores. Infected items can be disinfected with in 20 minutes. It takes 10 min to kill typhoid bacilli & 5 min to kill comma bacilli at 126^{0}F.

Spores are killed at 100^{0}C, but in boilers usual temperature is 90^{0}C. It is ideal for small instrument tools, which are not used for subcutaneous injection, linen and rubber goods such as gloves. Floors, walls & tables are disinfected by washing with boiling water. Addition of 2% washing soda accelerates germicidal power of boiling water.

Disadvantage–
- Slow
- Not suitable for woolen material which shrink

(2) Steam– Most efficient and practical way is applying moist heat for the purpose of disinfection. It enables higher temperature to be reached, without any damage to the articles and has penetrating power & infinitely more rapid than the dry heat.

Steam destroys micro organisms and spores at 212^{0}F in five minutes, where as hot air needs 250^{0}F for 4 hours.

Principles

Whether steam at normal pressure or under high pressure, when comes in contact with cooler article than itself, it immediately condenses and parts with its latent heat.

Saturated steam– more longer the water is boiled the pressure increases and such steam is called saturated steam.

'Super heated steam' – when the water present in the boiler is converted into steam, it has quality similar to hot air and is inferior in quality as disinfectant. Temparature 234^{0}F-248^{0}F for 20 minutes is reliable in all cases. Higher the pressure of steam, more rapid the penetration and less time required for disinfection.

Disadvantages

Woollen materials and feathers lose their colour, shrink on wet heat of 260^{0}F. Silk, cotton and linen withstand moist heat upto 260^{0}F for $^1/_2$ hour.

Majority of substances withstand heat upto 230^{0}F with out much injury.

High pressure disinfector

Washington Lyon (Manlove and Alliott) Equifex (Geneste-Herscher) Goddard, Massey and Warner.

Low pressure disinfector

– Reck's apparatus

– Theesh's current steam disinfector

Modern disinfector

Cylindrical boiler – outer, inner chamber, Jacket contains steam at pressure 20 lbs.

The things to be disinfected are placed in the inner chamber and steam at 15 lb is passed in the chamber, at the same time vacuum exhaust is set to extract the air.

Autoclaves

Sterilizers which operate at the high temperature (i.e. more than 100^{0}C) and pressure are called 'autoclaves', which generate steam under pressure.

- Double chamber (inner & outer)
- Single chamber

Principles of common pressure cooker are adopted here. 122^{0}C under 15 lbs/sq inch to 135^{0}C

It is most effective for sterilization of linen, gloves, syringes, instruments, culture media.

Disadvantage– It is not suitable for plastics & sharp instruments.

Radiation

Ionising radiation is increasingly used for sterilization of bandages, dressings, catgut, surgical instruments, plastic bags etc.

Chemical disinfection

Articles not fit to be sterilised by boiling or autoclaving immersed in these chemical disinfectants. They are also used for disinfection of faeces, urine and other contaminated material.

Mode of action

(1) Oxidising the protoplasm of the bacteria. Ex: halogen compounds, bleaching powder, potassium permanganate release nascent oxygen.

(2) By co-agulating protoplasm of the bacteria Ex: phenols and their derivatives.

(3) By ionic co-agulation Ex: metallic salts.

(4) By extraction of the water i.e. dessication.

(5) By emulsiod action and adsorption.

Some factors influencing the action of disinfectant

(1) Presence of electrolytes lower the value

Disadvantage– Oxidising agents give oxygen rapidly and become inhert. Metallic disinfectants do not have penetrating action.

(2) Germicidal action of phenol increases 7-8 times with every 10^{0}C rise of temperature.

Selection of disinfectants depend upon

(1) Nature of substance to be disinfected

(2) Resistance of organism to be disinfected

Factors influencing action of disinfectant

(1) Nature of invading organism and the numbers present.

(2) Nature and strength of antiseptic used and the extent to which its action is affected by the presence of organic matter.

(3) Time taken for the disinfectant to act efficiently.

(4) Nature of solvent used.

(5) The temperature.

Ideal disinfectant

(1) Powerful germicide, rapid action, great power of penetration.

(2) Definite affinity for particular organism under the given condition. It should be permanently homogeneous.

(3) Chemical properties should be such that, it will be fit for ordinary use and should not become inert by faecal or polluting material.

(4) It should not be injurious to human tissue and material to be disinfected.

(5) It should be soluble in water or form uniform emulsion in all proportions.

(6) Cheap and should not act on metals, bleach pigment or spoil fabrics & neither toxic nor caustic.

(7) High solvent power for grease is essential. Germicidal effect is stated interms of phenol co-efficient.

1. Phenols and its derivatives

(1) Phenol– Pure phenol or Carbonic acid is most important among phenols. Contact with air render the colourless crystals of phenol to pink, on prolonged exposure to dark red. Pure phenol is ineffective as a disinfectant. Commonly used phenol is 'Crude phenol', which is a mixture of phenol and cresol. It is a dark oily liquid.

Advantages

(1) Stable in presence of organic matter at ordinary temperature.

(2) Cheap and does not co-agulate albumin.

(3) Well adapted for mopping floors, side walls and ceiling.

(4) Efficient against gram positive, gram negative bacteria, slowly acts against spores and acid fast bacteria.

(5) 2% solution kills sporeless bacilli with in few seconds to 10 min.

(6) Addition of common salt or HCl increases the disinfection power greatly.

Disadvantages

(1) Poisonous and caustic, so effect the hands, so applied with mop or sprayed.

(2) Useless against spores.

(3) When dissolved in alcohol or ether the disinfectant power is lost.

Ex: **(1) Phenyl–** most popular and cheap.

(2) Izal– emulsion of higher phenol in water.

8 times more effective than phenyl.

In 500 – completely disinfects stools in 15 min

In 600 – completely disinfects urine in 5 min.

(3) Cyllin 17 times more powerful than phenol

Cheap and efficient, useful in disinfecting drain, privies, in 1 in 150 strength.

(4) Hycol– It has pleasant smell, 20 times stronger than carbolic acid.

(5) Creolin– 1/10th of strength of phenol as a disinfectant and becomes inert in presence of albumin.

(6) Lysol– Solution of cresol 50% in neutral potash, kills the bacteria in an hour. Cresol emulsified with soap is called as saponified cresol.

(7) Cresol– It is an efficient coal tar disinfectant, 3-10 times powerful than phenol, but not more toxic. Most effective, when used in 5-10% strength for disinfection of faeces and urine.

(8) Chlorhexidine– Most effective skin antiseptic, highly effective against vegetative gram positive and moderately active against gram negative microbes. Soaps and detergents inactivate them, 0.5% alcoholic or aqueous solution act as effective hand lotion. Cream or lotions with 1% Chlorhexedine is indicated in burns and as hand disinfectant.

(9) Hexa chlorphane– Very efficient against gram positive & less efficient against gram negative organisms.

(10) Dettol– Chloroxylenol is non toxic antiseptic & easily inactivated by organic matter, active against streptococci, useless in gram negative organisms, 5% Dettol can be used for disinfection of instruments, plastic equipments. It disinfects with in 15 minutes of contact.

Compounds of Quaternary Ammonia

(1) Cetramide– Manufactured under trade name cetavlov. Actively bacteriocidal against vegetative gram positive organisms and less so against gram negative, soluble in water and soapy to touch and used in 1-2% strength.

(2) Savlon– Combination of cetavlon and hibitane. Plastic appliances can be disinfected with in 20 minutes in normal strength. Savlon with 1 in 6 in spirit is more effective than savlon in 1 in 20.

Halogen and their derivitives

(1) Bleaching power– It is chlorinated lime, white powder with the smell of chlorine & 33% of available chlorine. Kills most of organisms when used in 1-3% solution. Widely used in India to disinfect public water, faeces, urine and as deoderant.

Demerit– It is an unstable compound, loses chlorine content on storage. 5% solution disinfect faeces and urine in one hour.

(2) Sodium hypochlorite– Action same as bleaching powder, more stronger, contains 80,000 to 1,80,000 ppm of available chlorine.

Disadvantage– Corrodes metals.

(3) Chlorine tablets– These are chlorine tablets 4 mg of halazone is needed to disinfect 1 lt of water in half to one hour. Taste of chlorine can be removed by adding 5.5 mg sodium thiosulphate in tablet form.

(4) Iodine– Iodine in alcoholic solution of 1-2% is the most effective antiseptic available, but may produce stains or sensivity reaction in same people, 1 in 2500 aqueous solution helps to disinfect plastic.

Advantage– Cheap and quick in action.

(5) Iodophores– Complexes of iodines and solubilisers povidine iodine. Betadin, activity same as iodine, but non irritant & do not stain the skin.

Useful antiseptic with sporocidal action

Rapidly inactivated by organic matter.

Alcohol & its derivitives

Ethyl and isopropyl alcohol are mostly used for disinfection. Ethyl alcohol in the form of methylated spirit is usually used for disinfection, pure alcohol is not having disinfection power, 70% concentration has best action, lethal with in seconds. Concentration 50 or below, the power of disinfection reduces.

Advantage– Fast acting, inactivate viruses.

Disadvantage– No action on spores and expensive.

Farmaldehyde

It is famous as formalin. Highly toxic precipitates irritant gas; and destroys protein. Active against bacteria, fungi, viruses and slowly active on spores (Ex: tetanus spores) and acid fast bacteria. 2-3% solution in water may be used to clean room, wall and furniture.

Advantage– Does not destroy cloth, commonly used in disinfection of rooms, blankets, beds, books etc.

Potassium permanganate

5% solution is used as disinfectant, stains cloth brown, which can be removed by oxalic acid or 0.5% solution. Lime also acts as deoderant.

Soap as disinfectant– Value limited alkali present in soap acts as disinfectant, but the quantity is so less, that it has no disinfectant action.

SO_2– It is a poisonous gas, in dry state it has no disinfectant action and ideal for ships, cars, stables, out houses.

Others

Lime is least priced of all disinfectants. 10-20% aq. solution is called milk of lime, disinfects faeces and urine with in 2 hrs. As a deoderant, it is used in cattle sheds, stables, public urinal etc.

Ethylene oxide– Articles damaged by heat are sterilized at 55-60^{0}C, which destroy bacteria and spores viruses. It is used to disinfect fabrics, plastic equipments, cardiac cathetres, books etc.

Methods of disinfection

(1) Stool and urine– Collected in enamel vessels and disinfected by combining equal volume of any one of the disinfectants like.

Bleaching powder 5%	– 50g/l.
Crude phenol 10%	– 10 ml/l
Cresol 5%	– 50 ml/l
Formalin 10%	– 100 ml/l

(2) Sputum– Gauze, tissue, kerchiefs are burnt idealy or boiling for 20% at 20 lb pressure or patient can spit in 5% or cresol solution.

Room– Cleaning, airing and direct sunlight for many hours.

Rarely fumigation by boiling formalin in 2 volumes of water and room is kept closed for 6-12 hrs.

	Trade names	Antiseptic germicidal
Dettol –	Chloroxylenol	4.8%
	Terpineol	9%
	Alcohol absolute	13.1%

Iteol–

Hydrogen peroxide–

Spirit –

Disinfectants

- Lizol
- Harpek
- Phenyl
- Bleeching powder

Respiratory Infections

Sl. N.	Infectious disease	Agent factor	Incubation period	Period of communicability	Source of Infection	Mode of trans-mission	Immunity, immuni-zation	Signs & symptoms	Ayurvedic correlation
1.	Small pox	Variola virus	12 days (7-17 days)			Droplet, Droplet nuclei, personal contact	On 8-05-1980 global eradica-tion	Rashes present in face, palms,soles,deep seated, multi locular vesicle, fever subsides after appearance of rashes.	मसूरिक क्रूरग्रहेणाच्चापि देश दोषा: समुद्धता:। जनयति शरीरेऽस्मिन् दुष्टरक्तेन सङ्गाता:।। (मा.नि.५४/२-३)
2.	Chicken pox (var-ricella)	Varic-ella zoster virus	15 days, (7-21 days)	1-2 day before onset of rashes to 4-5 day after appearance of rashes.	Case of chicken pox.	Drop let Drop let nuclei Personal contact	VZIG, varicella zosterimm-ungolobu-lin with in 72 hours of exposure, live atte-nuated vaccine	Rashes are superficial, circular dew drop like appearance, rash pleo-morphic i.e. different stages are present at a time, evolution is rapid & scabs form by 4-7 days, temperature rises with each fresh crop.	लघु मसूरिक

Respiratory infections

Sl. N.	*Infectious disease*	*Agent factor*	*Incubation period*	*Period of communicability*	*Source of Infection*	*Mode of trans-mission*	*Immunity, immuni-zation*	*Signs & symptoms*	*Ayurvedic correlation*
3.	Measles (Rubiola)	RNA paramy-xo virus (Rubiola)	10-14 days, average 7 days.	4 days before & 5 days after appearance of rashes	Case of measles	Droplet, Droplet nuclei	Measles vaccine at 9 months 0.5 ml S.C. or (attack of) measles	*Prodromal stage*-10 days, after infection fever, coryza, cough, nasal discharge, red-ness of eyes, photo-phobia, koplik's spot in bucal mucosa. *Eru-ptivephase*-dark red *macular*, maculopapu-lar rashes,behind ear, face,neck, body, in ab-sence of complication disppears by 3-4 days *Posteruptive* weight loss, growth retardation etc.	रोमकूपोन्नातिसमा रागिण्य: कफपित्तजा:। कासारोचकसंयुक्ता रोमान्त्यो ज्वरपूर्विका।। (मा.नि. ५४/१३)
4.	Rubella (German measles)	RNA toga virus	2 to 3 weeks, average 18 days	Week before symptoms to a week after appearance of rashes	Clinical & sub-clinical case.	Droplet, Droplet nuclei, vertical	MMR at 18 months, at-tack gives life time immunity	Prodromal-coryza sore throat, fever, Lympho-edenopathy post auri-cular & posterior cervi-cal lymphoedenopathy, 7 days of onset of rashes. Rash-Face, minute, dis-crete, pinkish macular rash disappear by 3rd day	

Respiratory infections

Sl. N.	*Infectious disease*	*Agent factor*	*Incubation period*	*Period of communicability*	*Source of Infection*	*Mode of trans-mission*	*Immunity, immuni-zation*	*Signs & symptoms*	*Ayurvedic correlation*
5.	Mumps	Myxovirus parotiditis	2-3 weeks usually 18 days.	4-6 days before onset of symptoms to one week or more after.	Clinical & sub-clinical case.	Droplet & direct contact	MMR at 18 months	Pain & swelling in one or both parotid glands, it may involve, sublingual & submandibular glands.Ear aches, pain, stiffness on opening mouth is present.	पाषाणगर्दभ- वात-श्लेष्मसमुद्भूत श्वयथु-र्हनुसन्धिजः स्थिरो मन्दरुजः स्निग्धो ज्ञेयः पाषाणगर्दभः॥ (सु.नि. ४०)
6.	Influenza	Influenza virus A, B, C, orthomyxoviridae family.	18-72 **hours**	1-2 days before & 1-2 day after onset of symptoms	Case & subclinical case.	Droplet Droplet nuclei	Split virus vaccine, neuraminidase Recombinant vaccine	Fever with chills, aches, pains, cough & generalised weakness. Fever lasts for 1-5 days	Jvara

Respiratory infections

Sl. N.	*Infectious disease*	*Agent factor*	*Incubation period*	*Period of communicability*	*Source of Infection*	*Mode of transmission*	*Immunity, immunization*	*Signs & symptoms*	*Ayurvedic correlation*
7.	Diphtheria	Caryne bacterium diphtheriae	2-6 days	Unless treated varies from 14-28 days after onset.	Case or carrier	Droplet droplet nuclei, direct contact	DPT-6 week, 10 week, 14 week DPT-16-24 month DT-5-6yrs. IM-0.5ml	Pharyngo tonsillar, laryngotracheal, nasal & combinations, sour throat, difficulty in swallowing, low grade fever. On examination mild erythema, localised exudate of membrane. Hoarseness of voice, cough, lymphoedenopathy giving **bull necked** appearance	रोहिणी- गलेऽनिलः पित्तकफौ च मूर्छितौ प्रदूष्य मांसं च तथैव शोणितम्। गलोपसंरोधकरैस्तथांकुरैर्निहन्त्यसून् व्याधिरयं तु रोहिणी॥
8.	Whooping cough (pertursis)	Bardetella pertusis	7-14 days	Week after exposure to 3 weeks after onset of paroxysmal stage.	Case or unrecognised case.	Droplet, Direct contact	DPT- 4 doses DT- 1 dose	Catarrhal stage-10 days Paroxysmal stage-2-4 weeks Convalescent stage 1-2weeks Bronchitis, Bronchopneumonia, Bronchiectesis, subconjunctival haemorrhage, epistaxis haemoptysis, punctate cerebral haemorrhage	–

Respiratory infections

Sl. N.	*Infectious disease*	*Agent factor*	*Incubation period*	*Period of communicability*	*Source of Infection*	*Mode of transmission*	*Immunity, immunization*	*Signs & symptoms*	*Ayurvedic correlation*
9.	Meningo coccal meningitis	N. meningitidis.	3-4 days, may vary to 2-10 days.	Till meningococci are not present in discharges of nose & throat or with 24 hours of specific treatment	Cases & carriers.	Droplet	Effective vaccine from Group A, Group C Group Y & Group W135	Also known as cerebrospinal fever, intense headache, vomiting & stiffness progresses. Untreated cases have 80% fatality rate.	क्रकच (सन्निपातज्वर) प्रलापायाससम्मोहा: कम्पमूर्छाऽरति भ्रमा:। मन्यास्तम्भेन मृत्यु: स्यात् तत्रेप्येतद्विशेषत:।। (च.चि.३)
10.	SARS (Severe acute respiratory syndrome)	New strain corona virus	2-7 days commonly 3-5 days		Case	Close contact, droplet		Fever, malaise, chills, headache, myalgia, dizziness, cough, sore throat & running nose rapid oxygen depletion with low oxygen saturation leading to acute respiratory distress.	–
11.	Tuberculosis	Mycobacterium Tuberculosis	3-6 week may extend to month or years	Infective as long as not treated, communicability reduces by 90% with in 48 hrs of treatment	Human bovine	Droplet Droplet nuclei	BCG-0.05 ml for below 4 weeks, infants 0.1 ml for others intra dermal route	Fever, malaise, general weakness, loss of weight, increased ESR, cough, with or without expectoration, haemoptysis, pleural effusion	राजयक्ष्म- कासोसंतापो वैस्वर्यं ज्वर: पार्श्वशिरोरुजा। छर्दनं रक्तकफयो: श्वासवर्चो गदोऽरुचि:।। (च.चि.८/४५)

Intestinal Infections

Sl. N.	*Infectious disease*	*Agent factor*	*Incubation period*	*Period of communi-cability*	*Reservoir of Infe-ction*	*Mode of transmission*	*Immunity, immuni-zation*	*Signs & symptoms*	*Ayurvedic correlation*
1.	Polio-myelitis	RNA virus	7-14 days range from 3-35 days.	7-10 days before & after onset of symp-toms.	Man sub-clinical & clinical cases	Faeco-oral route, in acute phase droplet in-fection	OPV at birth, at 6 week, at 10 week, at 14 week 3 drops-oral.	1. **In apperent** (sub clinical) **infec-tion**-approximately 95% case. 2. **Abortive polio/minor illness** mild self limiting illness. 3. **Non paralytic illness** (1%case)-stiff-ness, pain in neck & back, lasts for 2-10 days 4. **Paralytic illness** virus invades CNS & cause var-ying degree of paralysis. Fever malaise, anorexia, nausia, vomiting, headache,throat pain, abdominal pain, stiffness of neck,Paralysis with in 4 days	
2.	Hepatitis A (HAV)	Hepa-titis A virus HAV.	15-45 days usually 25-30 days	2 weeks before & 1 week after the onset of symptoms	Human cases & asympto-matic cases	Faeco-oral route, pare-nteral route, sexual tra-nsmission	After attack li-fe long imm-unity, human immunoglob-ulin & HAV live attenuat-ed vaccine	Non specific symptoms like fever, chills, headache, fati-gue, generalised weakness, aches & pain, anorexia, nausia, vomiting, dark urine, jaundice, subclinical or asymptomatic cases also occur.	Ref. No.1

Ref. No.1 कामला- हारिद्र नेत्रः सभृशं हारिद्रत्वङ्नखाननः । रक्तपीतशकृन्मूत्रभेकवर्णो हतेन्द्रियः॥
दाहाविपाक दौर्बल्य सदनारुचिकर्शितः । कामला बहुपित्तैषा कोष्ठशाखाश्रया मता ॥ (च.चि. १६/३५-३६)

Intestinal infections

Sl. N.	*Infectious disease*	*Agent factor*	*Incubation period*	*Period of communicability*	*Reservoir of Infection*	*Mode of transmission*	*Immunity, immunization*	*Signs & symptoms*	*Complications*
3.	Hepatitis B	DNA virus Dane particle (HBV)	45-180 days	Several months till HBs Ag disappears from surface antibody	Cases & carriers	Parenteral route perinatal sexual route.	HBIG Hepatitis B, immunoglobulin RDNA yeast derived vaccine, plasma derived vaccine	Acute self limiting infection either subclinical or symptomatic, symptoms are same as other hepatitis. But complications like carrier state & chronic liver disease may be severe.	Chronic active hepatitis, hepatocellular carcinoma, cirrhosis of liver
4.	Hepatitis C	RNA virus (HCV)	6-7 weeks		Case & carrier	Parenteral route		Clinical illness, mild, usually asymptomatic with high rate of chronic hepatitis, which leads to cirrhosis of liver or liver cancer	
5.	Hepatitis E (HEV)	RNA virus	2-9 weeks	–	Cases	Water borne & food borne	–	Hepalitis, In pregnant it may induce abortions, IUD & perinatal mortality & morbidity.	
6.	Delta hepatitis Hepatitis D	HDV virus	45-180 days	Several months & years	Case & carrier	Parenteral perinatal & sexual routes	Immunization against HBV	Similar to HBV	

Intestional infections

Sl. N.	*Infectious disease*	*Agent factor*	*Incubation period*	*Period of communicability*	*Reservoir of Infection*	*Mode of transmission*	*Immunity, immunization*	*Signs & symptoms*	*Ayurvedic correlation*
7.	Cholera	Vibrio cholerae	Few hrs-5 day commonly 1-2 days.	7-10 days convalescent carrier 2-3weeks Chronic carriers 1 month-10 years.	case & carrier	contaminated food & water, direct contact	0.5ml, in adults & adult, 0.3 ml 2-10 yrs, 0.2 ml 1-2yr.	1. **Stage of evacuation-** profuse painless watery diarrhoea followed by vomiting. Rice water stools may be 40 stools/day. 2. **Stage of collapse-** due to dehydration sunken eyes hollow cheeks, scaphoid abdomen, subnormal temperature, washer man's hands, absent pulse, unrecordable B.P., loss of elasticity of skin, shallow & quick respirations, restlessness, muscular cramp, anuria & death may occur. 3. **Stage of recovery-** B.P. returns to normal, temperature & formation of urine become normal.	विसूचिका- ऊर्ध्वंचाधश्च प्रवृत्तामदोषं यथोक्तं रुपं विसूचिं विद्यात् । मूर्छातिसारौ वमथु पिपासा शूलो भ्रमोद्वेष्टन जृम्भा दाहाः। वैवर्ण्य कम्पौ हृदये रुजश्च भवन्ति तस्यां शिरसश्च भेदः। (च.वि. ७)

Intestinal infections

Sl. N.	*Infectious disease*	*Agent factor*	*Incubation period*	*Period of communicability*	*Reservoir of Infection*	*Mode of transmission*	*Immunity, immunization*	*Signs & symptoms*	*Ayurvedic correlation*
8.	Typhoid fever	Salmonella typhi. S. paratyphi A S. paratyphi B	10-14 days, may be 3 days-3 weeks		Case & carrier	Faeco-oral route directly.	Antitypohoid vaccine, 2doses of 0.5 ml with interval of 4-6 weeks	Abrupt high fever with chills, malaise, headache cough, sore throat, abdominal pain may be prodromal symptoms. Fever ascends in stepladder pattern. After 7-10 day fever reaches plateu, weakness & pea soup diarrhoea may be present. Splenomagely, abdominal distension, tenderness, relative bradycardia & meningismus	अन्त्रिक ज्वर- शिरोरुगरुचिः सादो विबन्धोऽरतिस्तमः । स्फुटास्फुटं पूर्व लिङ्ग प्रायः स्यादन्त्रिके ज्वरे॥ (सि.नि.)
9.	Amoebiasis	Entamoeba Hystolitica	2-4 weeks	As long as cysts are excreted, may be several years.	Man	Faeco oral route	–	Abdominal discomfort, diarrhoea to acute fulminating dysentry. Extra intestinal amoebiasis includes liver abscess, lungs, brain, spleen, skin etc.	आमातिसार

Intestional infections

Sl. N.	Infectious disease	Agent factor	Incubation period	Period of communicability	Reservoir of Infection	Mode of transmission	Immunity, immunization	Signs & symptoms	Ayurvedic correlation
10.	Ascariasis	Ascaris lumbricoides	2 months	Untill fertile females are destroyed	Man	Faeco-oral route	–	Vague symptoms of nausea, abdominal pain & cough, worms are passed in stools & occassionally worms may be vomited.	कृमि
11.	Hook worm infection	Ancylostoma duodenale	7 weeks 5 weeks-9 months	As long as person harbours parasite	Man	Usually through skin of feet	–	Cause chronic blood loss & depletion of iron stores, iron deficiency anemia, in children growth retardation & development. In pregnants child birth with low birth weight, still birth, impaired lactation & diminished work capacity. capacity.	कृमि
12.	Dracunculiasis	Dracunculis medinensis	–	–	Man harbouring gravid female worm	Consumtion of water contaminated with cyclops	Amenable to eradication	Worm beneath the skin, local inflammation, erythema, giant urticaria, nausea, vomiting, diarrhoea, pain swelling, septicaemia	स्नायुक अत्यन्तवृष्ट्यादिनिमित्ततो यदा सेवेत दुष्टं बहुषो जलं ना शाखासु दोष: कुपितो विसर्पवच्छोथं तदा तस्य विधाय भिन्द्यात् ॥ (मा.नि. परिशिष्ट)

Arthropod borne infection

Sl. N.	*Infectious disease*	*Agent factor*	*Vector*	*Incubation period*	*Period of communi-cability*	*Reservoir source of infection*	*Mode of trans missio*	*Signs & symptoms*	*Compli cations*
1.	Dengue synd-rome	Flavi virus four sero type(1, 2,3,4)	Aedes aegypti mosquito	3-10 days commonly 5-6 days	1 day before onset of sy-mtoms to 5th day of illness		Vector	**1.Classical dengue fever/break bone fever**-sudden onset of high fever 39-40^{0}C with chills,intense headache, muscle & joint pains. Retrobulbar eye pain, photophobia, extreme wea-kness, anorexia, constipation, colicky pain, distaste, pain in inguinal region, sore throat. Milder symptoms may have rashes on face, neck & back lasts for few hours to several days. Fever lasts for 5 to 7 days. **Dengue haemorrhagic fever**- severe form with high fever, anorexia, vom-iting, epigastric pain, generalised ab-dominal pain, plasma leakage, abno-rmal haemostasis & thrombocytope-nia, epistaxis, petechae, perpura, ecchymosis.	Liver enlarg-ement, heme-temesis, melena.

Arthropod borne infections

Sl. N.	*Infectious disease*	*Agent factor*	*Vector*	*Incubation period*	*Period of communi-cability*	*Reservoir source of infection*	*Mode of trans missio*	*Signs & symptoms*	*Compli-cations*
2.	Malaria	Plas-modi-um vivax, P.falc-iparum P.mal-ariae- P. ova-le	Anapheles minimus A. flaviatilis A. dirus	12 days for falcifpar-um gamet-ocytes 14 days- 17- vivax ovale	As long as mature via-ble gameto-cytes exist in blood	One who harbours sexual form of paras-ite	Vector direct & vertical route rare	**Cold stage-** lassitude, headache, nau-sea, chills sensation, temperature upto 39-40^{0}C. In early part skin is cold, later it is hot.Pulse is rapid & weak. It lasts 1/4-1 hour.**Hot stage-** Patient feels burning hot & casts of his cloth, skin is dry & hot.Head ache is intense, pulse full & respiration rapid. It lasts for 2-6 hrs. **Sweating stage-** Fever comes down with pro-fuse sweating' skin is cold & mo-ist. Pulse rate is slow, patient feels relieved, P.ovale patient feels relieved & usually falls asleep. It lasts for 2-4 hrs.	Spleno-magaly Hepato-megaly, Anaem-ia, renal compli-cation, collapse

Arthropod borne infections

Sl. N.	*Infectious disease*	*Agent factor*	*Vector*	*Incubation period*	*Period of communi-cability*	*Reservoir source of infection*	*Mode of trans missio*	*Signs & symptoms*	*Ayurved-ic correl-ation*
3.	Lymphatic filariasis	Wuchereria bancrorofti, Brugia malayi, B Timori	Culex fu-tigans C. quinquefa-sciatus, mansonia mosquitoes	8-16 months		Human, monkeys cats,dogs	Bite of infected vector	1. Asymptomatic amicrofilaraemia. 2. Asymptomatic microfilaraemia-blood is positive for Mf, but symptoms are not present. It may be for months to years. 3. Acute manifestation-First few months of acute inflammation in lymph glands & lymph vessels. Fever, lymphangitis, lymphoednitis & lymphoedema of various parts & epididymo-orchitis in males. 4. Chronic obstructive leisons- After 10-15 years. Fibrosis & obstruction of lymphatic vessels, hydrocele elephantiasis, chyluria.	श्लीपदय: स्वज्वरो वङ्क्षणजोर्तिः भृशा शोथो नृणां पादगत: क्रमेण। तत् श्लीपदं स्यात् करकर्ण नेत्रशिश्नौष्ठा नासास्वपि केचिदाहु:।। (मा.नि. ३२/१)

Zoonoses

Sl. N.	*Infectious disease*	*Agent factor*	*Incubation period*	*Period of communicability*	*Reservoir of Infection*	*Mode of trans infection*	*Immunity immunization*	*Signs & symptoms*	*Ayurvedic correlation*
1.	Rabies, (Hydrophobia)	Lyssavirus RNA types 1 rhabdo viridae family	3-8 weeks	till death	Urban-dogs wild-fox, jackel, hyena, Bat rabies-saliva of rabied animal is source	Animal bites, licks, Aerosols, person to person (rare)	Nervous tissue vaccine, Duck embryo vaccine, cell culture vaccine	1. **Prodromal**-Headache, malaise sore throat, slight fever for 3-4 days. Pain & tingling sensation at the site of bite. **Excitation stage**-nervous system, sensory, motor, sympathetic nervous system-patient intolerant to noise, bright light, cold air, aerophobia (fear for air) characterised by pharyngeal spasm & spasm of neck muscles, dilatation of pupils, increased perspiration, salivation, lacrymation irritability and depression, Progressively leads to hydrophobia, later death occurs due to convulsion paralysis & coma.	अलर्क विषश्वशृगालतरवृक्ष व्याघ्रादीनां यदानिल: श्लेष्म प्रदुष्टोमुष्णाति संज्ञा संज्ञावघाश्रित तदाप्रस्रस्तलाङ्गूलहनु स्कन्धोऽतिलालवान् अत्यर्थबधिरोन्धश्च सोऽन्योन्याभिधावति ॥
2.	Yellow fever	Flavivirus fabricus	3-6 days	3-4 days of illness (man)8-12 days of-extrinsic IP (mosquito)	Monkeys, forest mosquito. aegypti	Vector bite A. Africanus A.Simpsoni after 10 years	17 D vaccine 0.5 ml IM irrespective of age, revaccination	Viral haemorrhagic fever characterised by severe hepatic & renal involement. In severe case jaundice & haemorrhage i.e. maifestation like black vomit epistaxis, melana, albuminuria, anuria, shock, agitation stupor & coma.	–

Zoonoses

Sl. N.	*Infectious disease*	*Agent factor*	*Incubation period*	*Period of communicability*	*Reservoir of Infection*	*Mode of trans infection*	*Immunity immunization*	*Signs & symptoms*	*Ayurvedic correlation*
3.	Japanese encephalitis	Group B arbovirus flavivirus	5-15 days		Animals & birds	Mosquito Culex vishui, C. tritaenoirhyneus	Mouse brain vaccine (killed) 2 doses, 1 ml SC, in interval of 7-14 days. revaccination after 3 years.	**Prodromal stage-** Acute onset, of fever, headache, malaise of 1-6 days. Acute encephalitic stage-High fever, nuchal rigidity, focal signs for CNS, convulsions, altered sensorium, some cases coma. **Last stage & sequele-** Acute inflammation neurological signs become stationary & tends to improve, case fatality is 20%-40%.	
4.	Kyasanur forest disease (KFD)	B.togavirus flavivirus	3-8 days		Small mammals specially rats & squirrels, monkeys	tick bite Haemaphysalis H.spinigera, H. turtura & monkeys	Killed KFD vaccine	Sudden onset of fever, headache, severe myalgia & prostration for about 2 weeks. Gastrointestinal disturbances, haemorrhage from nose, gums, stomach & intestines fever, headache, neck stiffness, coarse tremors, abnormal reflexes & mental disturbances.	

Zoonoses

Sl. N.	*Infectious disease*	*Agent factor*	*Incubation period*	*Reservoir of Infection*	*Mode of trans*	*Immunity imm-infection*	*Signs & symptoms unization*	*Ayurvedic correlation*
5.	Chikungunya fever	Group A virus Chikungunya virus.	2-3 days	Aedes culex & Mansonia mosquitoes	mosquitoes bite	–	High fever, articular pain in limbs & spinal colomn accompanied by chills, head ache, photophobia, anorexia,nausea, abdominal pain, arthritis afflicting small joints with migrating nature develop. Even rashes may develop.	–
6.	Brucellosis	Brucella B. Melitensis B. abortus, B. suis, B. canis	1-3 week highly variable	Cattle, sheep, goat, swine, bufallo, horses & dogs	Contact, food borne, airborne	Human live vaccine B. aboctus strain 19 BA	Swinging pyrexia (40-41°C), rigors, sweating, arthralgia of hip, knees, shoulder, ankle, low back ache, headache, insomnia, splenomegaly & hepatomegaly, Chronic low grade fever, ill defined disease lasting for months & years	–
7.	Lepto spirosis	Leptospira (spirocheates) L. interrogens	10 days (4-20 days)	Urine of infected animal. reservoir rats, mice, cattle, sheep	Direct contact, indirect contact, droplet infection	Specific immunity after infection, vaccination present	Mild febrile illness to severe fatal disease of liver & kidney, involvement, weil's disease is a form of manifestion	–

Zoonoses

Sl. N.	*Infectious disease*	*Agent factor*	*Incubation period*	*Reservoir of Infection*	*Mode of transmission*	*Immunity immunization*	*Signs & symptoms*	*Ayurvedic correlation*
8.	Plague	Yersinia pestis	2-7 days (bubonic & septicaemic 1-3 days pneumonic	Wild rodents reservoir. source wild rodents,fleas, case of pneumonic plague case	Xenopsilla. cheopis, X. braciliensis,P. irritans. Bite of flea, direct contact, droplet of pneumanic plague case	Killed vaccine 2 doses 0.5 ml SC. at interval of 7-14 days gives Immunity for 6 months.	**Bubonic plague**-sudden fever, chills, headache, prostration, painful lymphoedinitis, with in few days greately enlarged lymph nodes develop in groin, less often in axilla, neck depending on site of bite. **Pneumonic plague-** primary case is rare. It is complication of bubonic septicaemic plague, incidenence of primary **Septicaemic plague** is rare.. Bubonic plague may develop into septicaemic plague in overwhelming phase of infection.	
9.	Taeniasis Human cesticercosis	Tenia saginata T. solium	8-14 weeks	–	Ingestion of egg through water, meat	–	Vast majority case donot lead to any clinical ill health except occasional abdominal discomfort, anorexia, chronic indigestion, human cysticercosis-Eggs dispersed through out the body, where they develop into **cysticerci.** In brain they develop into neurocysticercosis which leads to epilepsy, hydrocephalous & intracranial hypertension and death	

Zoonoses

Sl. N.	*Infectious disease*	*Agent factor*	*Incubation period*	*Reservoir of Infection*	*Mode of transmission*	*Immunity immunization*	*Signs & symptoms*	*Ayurvedic correlation*
10.	Hydatid disease	Echino coccus E. granulosis E. multicularis E. oligarthus E. vogeli	From months to years.	dog, goat, sheep	Food borne	–	Symptoms manifested over years. From cyst of varying size, mostly in liver, lungs, brain peritoneum, long bones & kidney and produce respective symptoms.	
11.	Leishmeniasis (Kalazar)	Leishmania donovani C. brazileinsis	10 days to 2 years	dogs, jackal, foxes, rodents	bite of phlebotomine sand fly, P. Argentipse, P. papatasi, P. sergenti	–	Fever, splenomegaly, hepatomegaly accompanied by anaemia & weightloss darkening of face,hands feet & abdomen are common. Post kala azar **dermal leishmaniasis**- multiple nodular infiltration of skin with ulceration	वामे च पार्श्वे परिवृद्धिमेति विशेषतः सीदति चातुरोत्र। मन्द ज्वराग्नि कफपित्तलिङ्गै रुपद्रुतः क्षीण बलोऽति पाण्डुः ॥ (सुश्रुत)

Surface infection

Sl. N.	*Infectious disease*	*Agent factor*	*Incubation period*	*Period of communicability*	*Source of Infection*	*Mode of transmission*	*Immunity immunization*	*Signs & symptoms*	*Ayurvedic correlation*
1.	Tracho-ma	C.trach-omatis A,B,C	5-12 days	—	Ocular discharge of infected person, fomites	Direct & indirect contact	–	Inflammation of eyes leading to scarring of conjunctiva, in-word deviation of eye lashes (trichiasis) or eyelid margin (entropion), corneal ulceration, corneal ulceration, scarring & visual loss.	पोथकी
2.	Tetanus	Clistri-dium tetani	6-10 days	Not trans-mitted from person to person.	Soil & dust	Contami-nation of wound.	DPT-6 weeks 10 weeks, 14 weeks, Human tetanus immuno glob-ulin, tetanus toxoid IM0.5ml.	Muscular rigidity persists ass-ociated with pain, paraxism-al spasms of volutary muscles lock jaw, muscles of face, back, lower limbs & abdomen. Mortality rate 40-80%.	धनुस्तम्भ धनुस्तुल्योन-मेघस्तु स धनुस्तम्भ संज्ञितः ॥ (सुश्रुत)

Surface infections

Sl. N.	*Infectious disease*	*Agent factor*	*Incubation period*	*Period of communicability*	*Source of Infection*	*Mode of transmission*	*Immunity immunization*	*Signs & symptoms*	*Ayurvedic correlation*
3.	Leprosy	Mycobacterium laprae	3-5 years	Highly infectious, non infective after administration of dopsone for 90days Rifampicin 3 weeks	Multibacillary cases	Droplet contact other-breast milk tattooing	–	The disease characterised by hypopigmented patches, partial or total loss of cuteneous sensation leading to involvement of peripheral nerves, thickening of nerves, presence of acid fast bacilli, in skin & nasal smears. In advanced stages nodules or lumps are formed on face, ear, loss of toes, fingers, nasal depression, foot drop & other deformity Types: Indeterminate, Tuberculoid, Border line, Lapromatous, pure neuritic.	वातादयस्त्रयो दुष्टास्त्वग्रक्तमांसमम्बु च । दूषयन्ति स कुष्ठाना सप्तको द्रव्यसंग्रहः ॥ (च.चि.)

Kuprasaṇgaja Vyādhis/Sexually Transmitted Diseases

Word *kuprasaṅgaja* comprises of *'Ku'* ie bad, *'Prasaṅga'* ie. physical contact & *'Ja'* ie born or produced. These are the diseases produced due to bad contacts or in otherwords, known as sexually treansimitted diseases.

Phiraṅga, Upadaṁs'a & Uṣṇameha are three important diseases among these.

Sexually Trasmitted Diseases

Group of communicable diseases transmitted predominantly by sexual contact are called STDs. 5 classical VD (syphilis, gonorrhoea, lymphogranuloma venerum & donovanosis).

Male urethritis, lower genital syndromes in women, vaginitis, cervicitis, urethritis, genital ulceration, proctitis or colitis, salphingitis, epididymitis orchitis, infertility, ectopic pregnancy, postnatal & prenatal mortality, Hepatitis, hepatic carcinoma, genital carcinoma & AIDS are some common syndromes produced by STDs.

Among STDs gonorrhoea, syphilis & chancroid are important.

Incidence

Gonorrhoea	– 62 million
syphilis	– 12 million
Chancroid	– 2 million

It is most common in the age group 20-25 year old, followed 25-29 year, 15-19 year. Morbidity is high in males & severity is high in females. Single/divorced/separated couples & lower income group are prone for STDs.

Social factor

Prostitutes

Broken homes

Sexual disharmony

Easy money

Emotional immaturity

Urbanization, industrialization, social disruption, war, disaster, calamity, international travel import infection. Changing behavioual patterns like modernity, independence & freedom enhance the incidence.

Complications of STDs

1. Complications of pregnancy

– Congenital syphilis, still birth
Cytomegalovirus → birth defect
prematurity &
neonatal death

2. Complications in infants

N. gonorrhoea → blindness
C. trachomatis conjunctivitis, fatal pneumonia

3. Others

PID. Gonorrhea, chlamadia
infertility/ectopic pregnancy.
urethritis, stricture & cancer
Hepato cellular carcinoma in Hepatitis B
Primary lymphoma of CNS in AIDs

Phiraṅga (फिरङ्ग)

गन्धरोगः फिरङ्गोयं जायते देहिनां ध्रुवम् । फिरङ्गिणोऽगसंसर्गात् फिरङ्गिण्याः प्रसङ्गातः ।।
व्याधिरागन्तुजो ह्येष दोषाणामत्र सङ्क्रमः ।। (भा.प्र.उ.५९/३)

Phiraṅga is a contagious disease spread by the touch and sexual contact with the person suffering from this accidental disease, due to vitiation of *doṣas* which occurs later.

Types

Bāhya *Abhyantara* *Bahirantarbhava*

Features of bāhya Phiraṅga

तत्र बाह्य फिरङ्ग स्याद्विस्फोट सदृशोऽल्परुक्। स्फुटितो व्रणवद्वेद्यः सुखसाध्योऽपि स स्मृतः।।
(भा.प्र.उ.५९/५)

In this type the ulcer with less pain and oedema is produced, after bursting open, it should be treated like any other wound (*Vraṇa*).

Abhyantara Phiraṅga

सन्धिष्वाभ्यन्तरः स स्यादामवात इव व्यथाम् । शोथश्च जनयेदेष कष्टसाध्यो बुधैः स्मृतः ।।
(भा.प्र.उ.५९/६)

In case of internal *phiraṅga*, oedema & pain is produced in the joints as in *Āma vāta*, which is difficult to treat.

Complications (Upadrava)

कार्श्यं बलक्षयो नासाभङ्गो वन्हेश्च मन्दता । अस्थिशोषोऽस्थिवक्रत्वं फिरङ्गोपद्रवा अमी।।
(भा.प्र.उ.५९/८)

Emaciation, loss of strength, deformity in nose, *agnimāndya*, leanness of bones & deformity are complications of *phiraṅga*.

Treatment

Copacīni cūrṇa- 24 *Ratti*, *Rasa karpūra*- 4 *Ratti* bid.

Sapta Śālī vaṭi 1-0-0 in morning & *Dhūma prayoga*.

Syphilis

Agent : Treponema pallidum a spirochete.

Mode of Transmission– abrasion in skin, mucous membrane, blood tranfusion & Vertical route from mother to foetus.

Clinical features

Early syphilis

Incubation Period 9-10 days.

Primary leison/chancre develops at the site of infection, usually genital area. Dull red macule develops, becomes papular, erodes to form indurated ulcer (chancre). Inguinal lymph nodes are moderately enlarged, mobile, separate & rubbery. Both chancre & lymph nodes are painless, not tender, untill there is secondary infection. Chancre subsides without any treatment with in 2-6 weeks with an atropic scar. Extragenital ulclers is seen in 10% cases. It may be found on finger, tongue, nipple, rectum, lip, anus etc.

Secondary syphilis

Starts from 6-8 weeks after development of chancre, due to spread of T. paladium to multisystem.

Features– Mild fever, malaise, head ache & 75% with rash. Rashes are macular on trunk & limbs, evolution to maculo papular & papular rashes. They are symmetrical, non-irritable involving palms & soles. Candylomata lata- Papules with plaques in moist sites like vulva, perineal area with generalized lymphedenopathy in 50% patients, mucosal patches in genitals, mouth, pharynx, larynx & **Snail track ulcers** in mouth are present.

Other features

Meningitis, cranial nerve palsy, anterior & posterior uveitis, hepatitis, gastritis, glomerulonephritis & periostitis may be seen.

Clinical features may subside without treatment, but may relapse usually with in 1 years of infection.

Latent syphilis

Late syphilis persist for many years or life without treatment, over 60% expected to suffer no ill health.

Tertiary syphilis

Begins 3-10 yr after infection. Skin, mucous membrane, bone, muscle or viscera are involved. Chronic granulomatous lesion called gumma are present. Nodules or ulcer in skin, punched out ulcers in mouth, pharynx, larynx or nasal septum are present. Gamma of tibia, skull, clavicle, sternum, brain, spinal cord, liver, testis rarely in other organs is seen.

CVS syphilis

Aortitis is key feature, aortic incompetence, angina, aortic aneurisms may be seen.

Neurosyphilis- It takes many years to develop. CSF abnormality, meningo vascular disease, general paralysis, neurosyphilis & CVS syphilis together is called as **quaternary syphilis.**

Congenital syphilis

T. palladum cause variety of out comes after months of gestation.

Miscarriage/still birth/premature labour

Birth of syphilitic baby (very sick with hepatosplenomegaly, bullous rash & pneumonia).

Birth of baby who develop early congenital syphilis, during first few weeks of life or birth of baby, with latent infection either remains well or develops, late congenital syphilis or stigmata later in life.

Early congenital syphilis

Maculo papular rash, condylomata lata, fissures around mouth, nose & anus, rhinitis with nasal discharge, hepato splenomegaly, periostitis, general lymphoedenopathy, meningitis, anaemia & thrombocytopenia are the features.

Late congenital syphilis

Benign tertiary syphilis, periostites, paroxysmal cold, haemoglobinimia, 8th nerve deafness, clutton's joints (painless effusions of joints), stigmata, hutchison's incisors, mulberry molars, high arched palate, maxillary hypoplexia, saddle nose, choroiditis, corneal scars, bossing frontal & parietal bones are the features.

Investigations

Nonspecific- VDRL test (venereal disease research laboratory test) RPR test– Rapid plasma reagin test.

Specific- Treponemal antibody tests

EIA for IgG & IgM

(TPHA) Triponema palladum haemogglutinin tests.

(FTA-ABS) test–Fluorescent treponemal antibody absorbed test.

Upadaṁśa (उपदंश)

हस्ताभिघातान्नखदन्तपातादधावनादृत्यतिसेवनाद्वा ।
योनिप्रदोषाच्च भवन्ति शिश्ने पञ्चोपदंशा विविधापचारैः ।। (मा.नि. ४७/१)

Five types of *Upadaṁśa* are produced in genitals, due to the injury caused by hands, nails, teeth & improper hygiene & contact with person suffering from *upadaṁśa.*

Types– *Vātaja, Pittaja, Kaphaja, Raktaja & sannipātaja.*

Clinical features

Vātaja Upadaṁśa– Ulcers associated with severe cutting type of pain, pulsation & blackish in colour.

Pittaja Upadaṁśa– ulcers yellow in colour, associated with exessive discharge & burning sensation.

Kaphaja Upadaṁśa– Ulcers white in colour associated with oedema, itching & thick discharge.

Raktaja upadaṁśa– Ulcer which is thick like flesh, blackish in colour associated with burning sensation & blood discharge.

Sannipātaja upadaṁśa– Combination of above said features & difficult to cure.

Late stage

विशीर्णमांसं कृमिभिः प्रजग्धं मुष्कावशेषं परिवर्जयेच्च । (मा.नि.उ.४७/४)

Condition where in the ulcer is deep rooted, flesh gets torn, afflicted by infection, where only testicles are remaining should not be treated.

Gonorrhea

Neisseria gonorrhea is the agent, incubation period is- 2-10 days.

Clinical features

In males anterior urethra is infected, urethral discharge & dysurea are the features.

On examination mucopurulent urethral discharge is present. In 10 % cases symptoms are absent.

Male homosexuals are usually asymptomatic with, anal discomfort, discharge, rectal bleeding & inflammed rectal mucosa & mucopus.

In females

Paraurethral glands or ducts, bartholin's glands or ducts, endocervical canal are inflammed, rectum may be inflammed in anal sex, 50% are asymptomatic. Vaginal discharge, dysurea, lower abdominal pain, dysperunia, intermenstrual bleeding & PID are the features.

On examination lower abdominal tenderness, adnexal & cervical motion tenderness positive.

On bimanual examination, pus may be expressed from urethra, paraurethral glands & bartholin's glands. Pharyngeal gonorrhoea may occur in case of orogenital sex, symptoms are similar to sore throat or symptomless. Gonococcal conjuctivitis is characterised by purulent discharge, inflammation of conjunctiva, oedema of eye lids & photophobia.

Investigation

Smears of infected site reveal gram negative gonococci.

Complications

Acute prostatitis, epididymo orchitis, bartholin's gland abscess, PID, infertility, ectopic pregnancy, perihepatitis with hypochondriac pain & tenderness & purulent conjunctivitis.

Treatment

Uncomplicated cases, Ciprofloxacin 500 mg stat, Ofloacin 400 mg stat, Ampicillin 2 g- 3g, In case of pregnancy, lactation & pharyngeal gonorrhea, Ceftriaxone 250 mg stat.

According to *Āyurveda* it is considered as *Pūyameha*. The symptoms mentioned under *uṣṇa vāta* is similar to that of Gonorrhoea.

पित्तं व्यायामतीक्ष्णोष्णभोजनाध्वातपादिभिः । प्रवृद्धं वायुनाक्षिप्तं बस्त्युपस्थार्ति दाहवान् ।।
मूत्रं प्रवर्तयेत्पीतं सरक्तं रक्तमेव च । उष्णं पुनः पुनः कृच्छ्रादुष्णवातं वदन्ति तम् ।। (अ.नि. १)

Indulgence of excessive exercise, walking, intake of hot and piercing food, exposure to excess of sunlight leads to aggravation of vāta & pitta. Vāta throws the pitta to the bladder and produces burning micturation, yellow colouration of urine and blood in the urine repeatedly.

AIDS (Slim disease)

Acquired immuno deficiency syndrome is a modern pandemic affecting a large population in the world. **Problem of AIDs & HIV**

1999 -incidence 5.4 million
prevalence 34.3 million
deaths 2.8 million

Totally about 18.8 million deaths occured upto 1999.

India– Prevalence in 1999 was 3.7 million.

Analysis of surviellance data

Group I- Generalized epidemic, incidence cross 5% in high risk group & 1% or more in pregnant.

Group II- Concentrated epidemic, incidence cross 5% in high risk group & in pregnant less than 1%.

Group III- Low level epidemic, incidence reach 5% in high risk group & in pregnant less than 1%.

Agent factor

Human Immuno deficiency Virus HIV, Reservoir of infection- case & carrier, Once infected life time infected, Source of infection- blood, serum, CSF.

Host factor

Age- most 20-49 yrs. Sex- In North America, Europe australia 70% are men, in Africa equal in both male & female.

High risk group are male homosexuals & bisexuals, heterosexual partners, IV abusers. Immunity-Gradual depletion of specialised group of WBC called T helper cells.

Mode of transmission

1. Sexual 2. Blood contact 3. Maternal- foetal- vertical

Incubation period few months to 6 yrs.

Clinical Manifestations

I. Initial infection with virus & development of antibodies

II. Asymptomatic carrier state.

III. AIDS related symptom complex- ARC

IV. AIDS

I. Initial infection

70% of people after few weeks of exposure, develop mild illness, fever, sore throat & rash. But most are asymptomatic upto first five years.

HIV antibodies appear between 2-12 week in the blood stream & the period upto this is called **'window period'**, tests are negative for antibody test, but patient has HIV Infection.

II. Asymptomatic carrier

Condition with no clinical signs, but persistent generalized lyphoedenopathy.

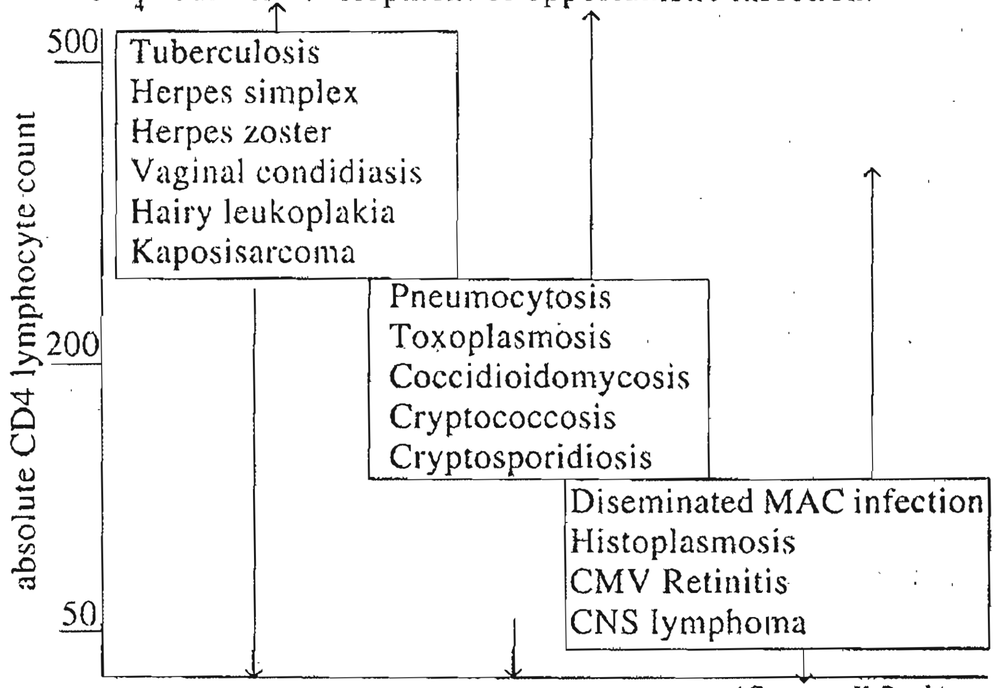
III. AIDS related symptom complex ARC

One or the other clinical signs are present. Unexplained diarrhoea lasting longer than a month, fatigue, malaise, loss of more than 10% of body weight, fever, night sweats, milder opportunistic infections like, oral thrush, generalized lyphoedenopathy or splenomegaly.

IV. AIDS

End stage of HIV infection, number of opportunistic infections occur in body. Tuberculosis & kaposi sarcoma develop in early stage. Candida oesophagitis, Cryptococcus meningitis & penicillosis, pneumonia (Pneumocystis carinį). Toxoplasma gondii, & encephalitis, when T cells reach around 100. Cytomegaloviral retinitis when T helper cell reach below 50. Chronic diarrhea, severe loss of weight, AIDS encephalopathy, demantia, Hairy leukoplakia, Herpes zoster & Herpes simplex also may develop.

CD_4 count & development of opportunistic infection.



(Curtecy K Park)

WHO definition

Major signs

Weight loss ≥ 10% of body weight, chronic diarrhoea for more than 1 month, prolonged fever for more than 1 month (intermittant/constant).

Minor signs

Persistant cough for more than 1 month, generalised pruritic dermatites, history of herpes zoster, oropharyngeal candidiasis, chronic progressive herpes simplex & generalised lymphoedenopathy.

Investigations

ELISA sera test for HIV antibody, confirmatory test western blot, CD4 lymphocyte count more than 950 CD4 cell/μL is normal, Patients of AIDs less the 200 CD4 cells/μL, 500 CD4 cells/μL threshold value for antiviral therapy. In such case once in 3 months CD4 count should be repeated.

Prevention & control

1. Education, 2. Prevention of blood borne HIV transmission.

Antiviral treatment

Nucleoside analogs:
- Zidovudine (AZT) Retrovir
- Didonosine (ddI) videx
- Zalcitabine (ddC) Hivid
- Stavudine (d4T) zerit
- Lamivudine (3TC) Epivir

According to Āyurveda, it can be considered as *Ojoskṣaya*, the symptoms & treatment are dealt under the section of immunity.

●

Chapter- 25

HOSPITAL BUILDING

Site– Place should be clean, hygienic and elevated from the ground, at the same time it should be easy for the patients to come. It should be near the main road.

Area– For twenty bedded hospital one acre land is ideal. But maximum forty patients can be accomodated in this area.

Ideally it should be single floored & more than 2 floors should not be built. Examination of the patient and office section should be on the ground floor. Office, outpatient department & inpatient department should be separate.

Administration section

This section includes different blocks for chief medical officer, assistants, attendants, nurses, canteen, store room, quarters for employees, washing & cleaning section collectively. The ways should be built for these sections properly.

Out patient department

It should be well ventilated, lighted & maintained clean.

(1) At the entry, section for registration of the name & age of patient should be present.

(2) Patients should be provided with large waiting room with sitting arrangement separate for males & females.

(3) **Examination room–** Different rooms for all specialities provided with proper ventilation & lighting should be present. It should be provided with examination table, bright light, sitting arrangement, screen, separate room for males & females.

(4) **Operation theatre–** It should be well illuminated, devoid of dust, infections & provided with glass doors, in north & south directions. It should be well illuminated, but light should not fall directly on patient or doctor. The walls should be smooth, shining & strong at least upto 15 ft height. It should be smooth & shining to make washing of walls easy. One should enter OT by wear-

ing sterilized OT dress. The gallery should be sloping to carry stretchers. Other side should be provided with steps.

In patient department

The wards should be rectangular in shape, separate for males & females. Distance between two wards should be double the height ie 30 feet. Each ward should be 25-30 feet broad, 12-15 feet height. Each patient should get 12 sq. ft area & 12 cubic feet air.

Proper ventilation should be present. Place should get fresh air through broad window provided with fine mesh to prevent entry of flies, mosquito etc. insects. Windows should be kept open to ensure supply of fresh air along with ventilators, which take away the impure air, especially they should be open during rainy season. Different wards should be constructed for different diseases. Otherwise communicable diseases may affect other patients also.

About 24-32 patients can be accomodated in one ward, space of 11 ft should be left between 2 rows of patients & 3 feet between 2 beds.

During extreme cold heating facility is necessary & fans during summer. Latrines & bathrooms should be constructed in corner separately for males & females near the ward. Passage for connecting ward with main hospital should be constructed, provided with roof.

Nursing section

In a corner near the main wards, rooms for nurses & attendants should be constructed provided with a window, opening towards the wards, to look after the patients.

Isolation ward

Separate building for patients suffering from infectious disorders should be constructed, to facilitate proper isolation & prevent the spread of communicable diseases like cholera, plague etc.

Special wards & cottage wards

For the rich patients wards with hightech facility like separate bathroom, latrine, kitchen, TV etc. should be constructed

Mortuary

It should be away from wards, provided with facilities for post mortem examination if necessary.

Beds

Preferably the cots should be made of steel of size 6 ft by 3 ft. It should be devoid of bed bugs.

Hygiene

Hospital should be cleaned twice daily with disinfectant, if necessary more times. Hospital waste can be disposed by burning or incineration.

Hospital building (Cikitsālaya bhavana)

तद्यथा-दृढं निवातं प्रवातैकदेशं सुखविचारमनुपत्यकं धूमातपजलरजसामनभिगमनीयमनिष्ठानां च शब्दस्पर्शरसरूप गन्धानां सोदपानोदूखलमुसलवर्च स्थानस्नानभूमिमहानसं वास्तुविद्याकुशलः प्रशस्तं गृहमेव तावत् पूर्वमुपकल्पयेत् ।। (च.सू. १५/६)

An expert architect should design a good building, which is strong & not exposed to strong wind. Wind should be allowed through only one passage. It should provide comfortable moving place. It should not be situated in mountainous place or near big building. It should be devoid of smoke, sun, stagnent water, dust, undesirable noise nor undesirable smell, touch, taste. It should be well equipped with water reservoir or water pot, morter, pestle, latrine, bathroom, kitchen etc.

Pañcakarma theatre (पञ्चकर्मागार)

ततः शीतशौचाचारनुरागदास्यप्रादक्षिण्योपपन्नानुपचारकुशलान् सर्वकर्मासु पर्यवदातान् सूपौदनपाचकस्नापकसंवाहकोत्थापक संवेशकौषधपेषकांश्च परिचारकान् सर्वकर्मस्वप्रतिकूलान्, तथा गीत वादितोल्लापकश्लोक गाथारव्यायिकेतिहासपुराण कुशलानाभिप्रायज्ञानानुमतांश्च देशकालविदः पारिषद्यांश्च ।। (च.सू. १५/६)

Arrangements should be made for attendants, who have good conduct, cleanliness, character, devotion, ability, sympathy, who are well versed in nursing & good in administering treatment. Many attendants for cooking soups, gruels etc. bathing, massaging, lifting, seating patients and grinding drugs should be present. They should be willing to work, people well versed with vocal & instrumental music, chanting of verses, ancient lores, stories, history, *purāṇa*, who can understand desire, obedient & have knowledge about time, place etc.

तथा लावकपिञ्जलशशहरिणैणकालपुच्छकमृगमातृकोरभ्रान् गां दोग्ध्रीं शीलवतीमनातुरां जीवद्वत्सां सुप्रतिविहिततृण शरणपानीयां, पात्र्याचमनीयोदकोष्ठमणिघटपिठरपर्योगकुम्भी कुम्भकुण्डशरावदार्वीकटोदञ्चनपरिपचनमन्थानचर्मचेलसूत्रकार्पास ऊर्णादीनि च, शयनासनादीनि

चोपन्यस्तभृङ्गारप्रतिग्रहाणि सुप्रयुक्तास्तरणोत्तरप्रच्छदोपधानानि सोपाश्रयाणि संवेशनोपवेशन स्नेहस्वेदाभ्यङ्गप्रदेह परिषेकानुलेपनवमन विरेचनास्थापनानुवासन शिरोविरेचन मूत्रोच्चारकर्मणा-मुपचारसुखानि, सुप्रक्षालितोपधानाश्च सुश्लक्ष्णखर मध्यमा दृषदः, शस्त्राणि चोपकरणार्थानि धूम नेत्रं च, बस्तिनेत्रं चोत्तरबस्तिकं च कुशहस्तकं च तुलां च, मानभाण्डं च घृततैलवसामज्जा क्षौद्रफाणित लवणेन्धनोदकमधुसीधुसुरासौवीरकतुषोदकमैरेयमेदकदधि दधिमण्डोदस्विद्धान्याम्लमूत्राणि च, तथा शालि षष्ठिक मुद्गमाष यवतिलकुलत्थ बदरमृद्वीक काश्मर्य परुषक अभया आमलक-बिभीतकानि, नानाविधानि च स्नेहस्वेदोपकरणानि द्रव्याणि तथैवोर्ध्वहरानुलोमिकोभयभाञ्जि, संग्रहणीय दीपनीय पाचनीयोपशमनीय वातहरादिसमाख्यातानि चौषधानि, यच्चान्यदपि किञ्चिद्व्यापदः परिसंख्येय प्रतीकारार्थमुपकरणं विद्यात्, यच्च प्रतिभोगार्थं तत्तदुपकल्पयेत् ।। (च.सू. १५/७)

- Birds like – *lāvā* (common quail) *Kapiñjala* (Gray partridge), Animals like *Śaśa* (rabbit), *Hariṇa* (black buck), *eṇa* (antelope), *Kālapucchaka* (black tailed dear), *Mṛgamātṛka* (Red dear), *Urabhra* (Wild sheap) should be present. Cow with good temper, free from diseases having young calf should be present. Proper arrangement for her fodder, dwelling & water should be made.
- Provision should be made to keep *Pātri* (water vessel), *ācamanīya* (spoon), *Udakoṣṭha* (water tub), *Maṇika ghata* (big & small mud jars), *Piṭhara* (frying pan), *Paryoga* (boiling pan), *Kumbhi, Kumbha* (small & big pitcher), *Kaṇḍa* (bowl), *Śarāva* (saucer), *dārvi* (ladle), *Kaṭa* (mat), *Udañcana* (cover plate), *Paripācana* (cooking pan), *Manthana* (churner) *Carma* (leather), *Vastra* (cloth), *Sūtra* (thread), *Kārpāsa* (cotton) *Ūrṇa* (wool) etc.

Other arrangements

Arrangements made for bedding, seats etc. Golden vessel & spittoons should be provided. Bedsheet, towel, pillow, cushion should be kept in place to assist lying flat, sitting, oleation, foementation, massage, unction, effusion, anointment, emesis and purgation, *Āsthāpana basti, anuvāsana basti, nasya* & passing stools & urine.

Instruments

Morter which are cleaned, smooth, hard & medium sized along with pestle, different (sharp instruments) & accessories should be present. *Dhūmanetra, Bastinetra, Uttarabastinetra, Kuśahastaka* (brooms), *Tula* (weighing machine), *Mānabhāṇḍa* (meauring jar) etc should be present.

Medicaments for Pañcakarma

Ghee, oil, fat, bone marrow, honey, phāṇita, salt, various alcoholic preparations like surā, sīdhu, sauvīraka, maireya, medaka, Tuśodaka.

Udaśvit, dhānyāmla, śāli, ṣaṣthika, mudga, māṣa, yava, tila, kulattha, badara, mṛdvīka, kāśmarya, paruṣaka, Abhaya, Āmalaki, Vibhītaki & other drugs employed in Vamana, Virecana, Snehana and Svedana etc procedures should be present.

Management of emergency

Drugs required for management of complications due to *pañca karma* having Saṅgrahaṇīya, Dīpanīya, Pācanīya, Upaśamanīya & Vātahara property are kept. The medicines useful after Pañcakarma treatment are also kept.

Vraṇitāgara (व्रणितागार)

प्रशस्त वास्तूनिग्रहे शुचौ आतपवर्जिते । निवाते न च रोगाः स्युः शरीरागन्तु मानसाः ।।

The building built according to rules of *vāstu*, kept clean, devoid of direct sunlight, strong winds prevent bodily, mental as well as accidental diseases.

Part- II
(Second Paper)
Chapter- 1
YOGA

योगात्सञ्जायते ज्ञानं ज्ञानाद्योग प्रवर्तते । योगज्ञान परो नित्यं स योगी न प्रणश्यति ।।
(त्रिशिखिब्रह्मणोपनिशत् १९)

Knowledge originates from *Yoga*, knowledge inturn potentiates *yoga, yoga* & knowledge are eternal & *yogi* also attains immortality.

पूर्णमदः पूर्णमिदं पूर्णात् पूंर्ण उपच्यते । पूर्णस्य पूर्णमादाय पूर्णमेवावशिष्यते ।। (त्रिशिखिब्रह्मणोपनिषत्)

(1) Etymology of Yoga & Its different definitions (योग शब्द उत्पत्ति-विविध व्याख्या)

"युजिर् योगे" ।। उपनिषद्

to unite, combine, integrate

युज्यते अनेन इति योगः।।

That which unites is known as *yoga*. That which brings about union of soul with god is *yoga*.

योगः कर्मसु कौशलम् ।। (भ.गी.)

Yoga is a skilled performance.

समत्वं योगमुच्यते ।। (भ.गी २/४७-४८)

State of balance between failure & win or body & mind is *yoga*.

तं विद्यात् दुःखसंयोग वियोगं योग संज्ञितं । (भ.गी. ६/२३)

Remaining unbounded with the happiness & miseries of the world is *yoga*.

योगः चित्तवृत्ति निरोधः ।। (प.यो.सु.१/२)

Cessation of mental modifications or *citta vṛttis* due to mind, intellect & ego.

Cittavṛtti

प्रमाणविपर्ययविकल्पनिद्रास्मृतयः ।। (प.यो.सू. १/७)

Patañjali mentions five *'cittavṛttis'* which produce pleasure & pain.

1. Pramāṇa– (source of knowledge) It is of three types *pratyakṣa* or direct evidence, *Anumāna* or inference & *Āgama* or holy texts vedas etc.

2. Viparyaya– Mistaken view like wrong interpretation, wrong diagnosis etc.

3. Vikalpa– (Fantasy or imagination) A poor person becomes happy by imagining crores of rupees.

4. Nidra (sleep)

5. Smṛti (memory)– Remembering experience of past.

Pañca kleśa

अविद्यास्मितारागद्वेषाभिनिवेशाः ।। (प.यो.सु. १/३)

Avidyā	- Ignorance
Asmitā	- Feeling of individuality
Rāga	- Attachment
Dveṣa	- hatred
Abhiniveśa-	love or thirst for life.

Citta denotes mind, intellect & ego. *Triguṇās satva, rajas* & *Tamas* & *Tribhāvas* always influence *citta*.

Citta bhūmi

→ Mūḍha– Due to predominance of *Tamas*, mind is dormant in active state leads to sleep & laziness.

→ Kṣipta– It is due to predominance of *Rajas*, here always mind wavers.

→ Vikṣipta– Stability for short period.

→ Ekāgra–Due to predominance of satva, mind is stable as in meditation.

→ Niruddha– Due to predominance of Satva mind is stable, peaceful & natural.

Kaṭhopaniṣad

Yoga is that state, where all sense organs are controlled & steady.

Rajaneesh

Yoga means unknotting of mind to reach a degree of level of consciousness.

B.K.S. Iyengar

Yoga is a education & character building. It is general systematic set of practices, through which, one can attain super natural power through the process of concentration.

Yoga is methodological effect towards self purification by development of potential latent in the individual.

Svāmi Vivekānanda

Yoga is comprising of ones own evolution into single life of few months, there of ones own bodily existance.

Svāmi Aravinda

Role of *yoga* is alround personality development in physical, mental, emotional, spiritual & intellectual level.

Evolution of Yoga

प्रदीपः सर्वविद्यानां उपायः सर्वकर्मणाम् । आश्रयः सर्वधर्माणां शश्वदान्वीक्षकी मता ।। (कौ.अ.)

Yoga and *sānkhya* are known as *Anviksaki* vidyā, in which *dharma, adharma* is discussed. It is the science which deals with gaining intellectual balance in happiness and misery and gaining the ability to think and act.

History always helps to understand the subject more accurately. Here also it is helpful to consider the social, religious, mechanical and spiritual status of that time, when *yoga* originated.

In Patañjalis, *yoga sutra*, the word *yogānuśāsanam* is mentioned, which clearly indicates it is the remark of yoga text which existed prior to it, that was yoga science described by *Hiranya garbha. Hiranya garbha* is the first descibe to *Aṣṭāṅga yoga.*

Yoga word is used in vedic and Vedānta literature in Upaniṣads.

Yoga yājñyavalka also consists of detailed information about *aṣṭāṅga yoga. Purāṇās* are the most common source of knowledge and said to be an easy form of eduction. Agni purāṇa, Vishṇu purāṇa, *Garudha purāṇa* are the *purāṇas,* where detail description of Āsana *Prāṇāyāma* can be seen.

The history shows us how the same principles of yoga are expressed in an easy and explanetory way in *Bhagavad gītā.* It is the first book where all branches are explained. The aim of *yoga* is pictured in Gīta. The way to get free from sorrows, the way to over come anger misery and to achieve the equilibrium are mentioned.

इमं विवस्वते योगं प्रोक्तवानयमव्ययम्। विवस्वान्मनवे प्राह मनुरिक्ष्वाकवेऽब्रवीत्।।(भ.गी.४/१)

Hathayoga pradīpika is the text in which *Āsana and prāṇāyāma* are described in detail compared to previous literature. It is text by yogi Svātmā rāma. *Gheraṇda saṁhita* is also very useful text by great sage *Gheraṇda.* The text named *Hatharatnāvali* was written by *Srinivāsa Bhatta Mahayogindra* and is one of the major texts of *yoga.* These tests are considered to have been written between 6th and 15th centuries A.D.

The book written by K.K. Kolhatkar on yoga named as *Bharatīya Mānasa śāstra* on yoga is the series of efforts taken for stabitity of the mind. The books by Sri B.K.S. Iyengār on *prāṇāyāma, āsanas and yoga* is an excellent way to explain yoga. A number of books researches have been published by *Vivekānanda yoga kendra* Bangalore, J.C. yoga centre Bombay, *śivānanda yoga* center & yoga school of Bihar Munger.

Thus yoga is the correct answer for question of modern world regarding the healthy body, mind and spirit.

(3) Types of Yoga (Yoga prakāra)

→ Bhakti yoga
→ Jñāna yoga — three main paths of salvation
→ Karma yoga

→ Haṭha yoga — Laya yoga
→ Rāja yoga — Kuṇḍalinī yoga

Nāda yoga

Mantra yoga

Jñāna yoga/Sanyāsa yoga/Sānkhya yoga (ज्ञानयोग-सन्यासयोग-सांख्ययोग)

The imbalance between *satva, rajas & Tamas* itself is *'Māya'* which is responsible for desire, hatred, anger, passion etc. *Ariṣaḍvarga.* The person devoid of these blemishes becomes one with *Paramātma* by gaining knowledge about self, i.e. *Ātmajñāna* is called *Jñānayoga.* This is for the person, who is not interested in worldly pleasures. One who discards pleasures is called *Sthitaprajña* & attains salvation.

Steps to attain knowledge

1. Śubha → Auspicious thoughts about Yoga.
2. Vicāraṇa → State of inquiry developed from aspiration to get knowledge
3. Tanumanasi → Thinning of mind & getting rid of desires.
4. Satvamati → Purity of mind. It is complete bliss state of mind.
5. Asamaśakti → Detachment or passiveness is there ie. Vairāgya.

6. Padārthabhāva → Realization of absolute one, truth of existance.
7. Turīya → Final realization. All miseries are lost &direct attachment with *Paramātma.*

Meditation in Jñāna yoga

Essence of *vedas* is considered as *mahāvākya.*

1. प्रज्ञानं ब्रह्मं → Understanding of *Brahma* as pure consciousness, cause, source of world.

2. तत्वमसि → Consciousness of self

3. अहं ब्रह्मास्मि → I am *brahma.*

Bhakti yoga

Inner love towards god leads to liberation.

According to *Maharṣi Nārāda*–

सत अस्मिन् परम प्रेम रूप ।

Intense love towards god. It is like nector. It acquires freedom from birth and death. Once indulged in pure devotion liberation from birth and death is complete, love gives self realization.

First arises faith → love → suppression of desire → complete knowledge → single mindedness → satisfaction → supreme love towards god.

Rāmānujācārya identified devotion by doing meditation.

Bhakta Prahlāda advices to direct love towards worldly matter by people to devotion towards god.

According to *Devi Bhagavata* love is compared to uninterrupted thought towards god.

Kapila considers it as flow of uninterrupted thought towards god, seated in hearts of living beings, as the water of *Gaṅgā* towards sea.

Sage *Nārada*- what ever power is with god. He has all *aiśvarya,* devoid of *kleśa,* loss of effects of deeds liberated from cycle of birth & death. Reflected back by the devotion, we show towards god.

Means of Bhakti yoga

प्रतीक (symbol) → tells about symbol of god (ॐ)

प्रतिमा (statue) → worshipping idols

नाम (Name) → chanting names of god.

Modes of devotion

- श्रवण (Hearing *Bhagavadgītā, Rāmāyaṇa*)
- कीर्तन (Chanting hymns, devotional songs etc.)
- स्मरण (Remembering god)
- पाद सेवन (Serving *guru*, parents)
- अर्चन (Offering flowers)
- वन्दन (Salutation before diety)
- दास्य (Attitude of devoted servant towards master)
- सख्य (Friendship towards god)
- आत्मनिवेदन (Self surrunder towards god)

Kinds of feeling

- शान्त (Peace)
- दास्य (Servant)
- सख्य (Friendship)
- वात्सल्य (Affection)
- माधुर्य (Sweet)

Means of developing devotion

1. Serve the offering to great person (*Mahātma*) or parents
2. Repeatation of gods name & rememberance
3. Pilgrimage or journey to holy place
4. Satsaṅga ie. company of good people
5. Remembering & singing about *Hari*
6. Study of religious books

Forms of love

1. स्नेह – Deep affection
2. मन – Sentement of pleasent thing
3. प्रणय – Love makes himself that same
4. राग – Deep attachment
5. अनुराग – Transmuted attachment
6. भाव – Deep emotion
7. महाभाव – Transmuted emotion

Forms of worship

1. आसन – Offering seat to desired god.
2. स्वागत – Welcoming
3. पाद्य – Washing the feet of idol
4. अर्घ्य – Offering holy water
5. आचमन – Sipping holy water

Karma yoga (कर्म योग)

Samatvayoga/Buddhiyoga/Tadartha karma/Matkarma (समत्वयोग/ बुद्धियोग/ तदर्थकर्म/ मत्कर्म)

कर्मण्येवाधिकारस्ते मा फलेषु कदाचन । मा कर्म फलहेतुर्भूमा ते संगोस्त्वकर्मणी ।।
योगस्थः कुरुकर्माणि संगं त्यक्त्वा धनञ्जय । सिद्ध्यासिद्ध्यो समो भूत्वा समत्वं योगमुच्यते ।।
(भ.गी २/४७-४८)

Always perform duties without any expectation of fruit, it should not happen that one does not do any work, so *Arjuna* do duty without any expectation & take success & failure equally. This balance is known as *yoga.*

योगानुष्ठानादशुद्धिक्षये ज्ञान दीप्ति विवेकख्याते । (यो.द. २/२८)

By the practice of *yoga* all sorrows & blemishes are cured, one is enlightened with knowledge & *Viveka.*

Mantra yoga (मन्त्र योग)

मातृकादियुतं मन्त्रं द्वादशाब्दं तु यो जपेत् । क्रमेण लभते ज्ञानमणिमादिगुणान्वितम् ।।
अल्प बुद्धिरिमं योगं सेवेत साधकाधमः ।। (योगतत्वोपनिषत् २१-२२)

Hymns are secrete formulas, which are supposed to contain mistical sounds with or without meaning. There is correspondence between subtle sounds of hymns & subtle organs of human body. On one hand subtle organs of human body & subtle forces in cosmic universe are awakened by corresponding hymn. Each hymn has certain vibration which produce effect, which calms down the mind. It helps to change the individual. According to *Gīta,* the word begins from *'Om'* which is universal *Mantra.*

If hymns are chanted for 12 years, then gradually knowledge along with *Aṣṭaiśvarya* are gained. It is ideal for persons having less intellect.

Haṭha yoga (हठ योग)

शरीर साधना प्रधान हठयोग ।

Haṭha yoga gives importance to strengthening the body.

Definition & objective of Haṭhayoga

हकारेण तु सूर्यः स्यात् सकारेणेन्दुरुच्यते । सूर्यचन्द्रमसौरैक्यं हठ इत्यभिधीयते ।।
(योगशिखोपनिषत्१/१३३)

'Ha' represents *'sun' (Piṅgala)*, *'sa'* represents moon (*Iḍa*), union of *sūrya* and *candra* is called as *Haṭha*.

हकारेण बहिर्याति सकारेण विशेत्पुनः । हंस हंसेति मन्त्रोयं सर्वैः जीवैश्च जप्यते ।।(गो.सं.१/४१)

The *'prāṇa'* vital force, comes out with *'Ham'* chanting & goes inside with chanting *'sa'*. So all beings always chant the hymn *Haṁsa*. Later on this gradually transformed to *Haṭha* by later *Acāryas*.

Haṭha is made of 2 letters *Ha* means sun or *'piṅgala'* & *'ṭha'* represents moon or *Iḍā*, which represent breath flow through the nostrils. *Sūrya* represent *'Prāṇa'* and *Candra* denotes *Apāna*. The means through which, these get united with the help of *Prāṇāyāma* is called as *Haṭhayoga*.

सहाय्यात् स्थूलदेहस्य चित्तवृत्ति निरोधनं । यत्र संसिध्यते धीरैर्हठयोगः स इष्यते ।।

With the help of gross body control of *Cittavṛtti* by the practice of *Prāṇāyāma, Asana* etc. by a strong person is called as *Haṭhayoga*. It is starting point for various forms of *yoga*.

Relation between Haṭhayoga & Rājayoga

हठं विना राजयोगो राजयोगं विना हठः । न सिद्ध्यति ततो युग्मभानिष्पते समभ्यसेत् ।।
(ह.यो.प्र.२/७६)

One can not achieve mastery over *Rājayoga*, without the practice of *Haṭhayoga*, similarly *Haṭhayoga* cannot be conquered without the help of *Rājayoga*. So both of these should be learnt simultaneously.

Features of Haṭhayoga Siddhi

वपुः कृशत्वं वदने प्रसन्नता नादस्फुटत्वं नयने सुनिर्मले अरोगता बिन्दुजयो अग्निदीपनं नाड़ीर्विशुद्धिः हठयोग लक्षणं ।। (ह.यो.प्र.२/७८)

Lean body, pleasant face, clear and melodius voice, eyes clear of blemishes, bright healthy body, abstinence, enhancement of Agni and purity of all nadis are the characters of Haṭhayoga siddhi.

Rāja yoga (राज योग)

नित्यानित्यस्वरूपाणां पदार्थानां विवेकतः । त्रिगुणां त्रिभावानामपि नित्यं विमर्शतः।।
शक्तिमध्यात्मकीं यत्र योगिनां व्रजतां स्वतः । चित्तवृत्तिनिरोधः स्याद्राजयोगाऽयमुच्यते ।।

One endowed with knowledge about eternal soul & non eternal body, conquers unhappiness produced due to *Triguṇās ie satva, rajas & tamas* & *Tribhāvās ie. Rāga (love). Dveśa (hatred)* & *Triṣṇa* (desire) by his spiritual power, philosophical power & gains victory over *Cittavṛtti*. This is called *Rājayoga. Patañjali's yoga sūtra* supports *Rājayoga*.

Description of Yoga in Ayurveda (आयुर्वेद तथा योग)

Aims of *Āyurveda* & *yoga* are same ie. attainment of salvation.

धर्मार्थ काममोक्षाणां आरोग्यं मूलमुत्तमम् ।। (च.सू. १/१५)

Health is a main root through which, one can achieve salvation. In *Caraka saṁhita, śārira sthāna* vast references of *yoga* is available.

योगे मोक्षे च सर्वासां वेदनानामवर्तनम्। मोक्षे निवृत्तिर्निःशेषा योगोमोक्षप्रवर्तकः।।(च.शा.१/१३७)

Recurrence of all feeling are blocked through *yoga* & *mokṣa*. The complete eradication of feelings are attained through *mokṣa*. *Yoga* is a means to attain *mokṣa* (salvation).

धीधृतिस्मृतिविभ्रंशः संप्राप्तिः कालकर्मणाम् । असात्म्यार्थागमश्चेति ज्ञातव्या दुःखहेतवः ।।
(च.शा.१/९८)

Impairment of intellect, endurance & memory, effect of maturity of time & action & unwholesome contact with objects with sense organs are considered to be the causative factors for unhappiness.

Satyābuddhi & Yogasiddhika buddhi (सत्याबुद्धि तथा योगसिद्धिका बुद्धि)

सर्वं कारणवद्दुःखमस्वं चानित्यमेव च । न चात्मकृतकं तद्धि तत्र चोत्पद्यते स्वता ।।
यावन्नोत्पद्यते सत्या बुद्धिर्नैतदहं यया।नैतन्ममेति विज्ञाय ज्ञः सर्वमतिवर्तते।।(च.शा.१/१५२-१५३)

Any thing that has cause is misery, it is not related with soul & ephemeral. Misery is not produced by soul, but due to ignorance one feels that, he is the owner of soul. This false befief exists till the dawn of Satyā buddhi ie real knowledge. The person realises that, he is not born out of Ahaṁkāra and becomes liberated from all bondings and miseries.

Cessation of sukha & dukha in Yoga approved by Āyurveda (योग एवं आयुर्वेदे सुखः तथा दुःख निवृत्ति)

आत्मेन्द्रियमनोर्थानां सन्निकर्षात् प्रवर्तते । सुखदुःखमनारम्भादात्मस्थे मनसि स्थिरे ।।
निवर्तते तदुभयं वशित्वं चोपजायते । सशरीरस्य योगज्ञास्तं योगमृषयो विदुः।।(च.शा.१/१३८-१३९)

One experiences happiness & miseries due to the contact of soul, with the sense organs, mind & objects of senses. These sensations disappear when mind is concentrated & becomes one with in soul & the person attains supernatural powers in the mind & body. This state is known as *yoga*.

Obstacles in the path of Yoga (योगाभ्यास प्रतिबन्धकर भाव विघातकर भावऽ)

अत्याहारः प्रयासश्च प्रजल्पो नियमग्रहः । जनसङ्गश्च लौल्यश्च षड्भिर्योगो विनश्यति ।।

(ह.यो.प्र.१/१५)

Eating excess of food leads to laziness, diminition of *Agni*, indigestion, excess of work leads to exertion, excessive talk leads to hatred, jealousy, anger, ego, following rules, contact with many people & greediness are considered as factors, which lead to obstruct *yoga*.

Obstacles in the path of Yoga (बाधक तत्व)

व्याधिस्त्यानसंशयप्रमादालस्याविरतिभ्रान्तिदर्शनालब्धभूमिकत्वाऽनवस्थितत्वानि चित्तविक्षेपास्तेऽन्तरायाः।। (यो.सू.१/३०)

Vyādhi - disease which disturbs the normalcy

Styāna - lack of aim, enthusiasm, with dull intellect

Saṁśaya - doubt

Pramāda - insensibility

Alasya - laziness

Avirati - arousal of worldly desires

Bhrānti darśana - illusion

Alabda bhūmikatva - failure to concentrate on same thought

Anavasthitatva - instability

Factors responsible for Yoga siddhi (योगसिद्धिकर भाव)

उत्साहात्साहसाद्धैर्यात् तत्वज्ञानाच्च निश्चयात् । जनसङ्गपरित्यागात्षड्भिर्योगः प्रसिद्ध्यति ।।

(ह.यो.प्र.१/१६)

Enthusiasm in performing work, without which anything is not possible. One should be ready to do difficult yogic procedures. Brave enough to practice difficult path of yoga, which is possible through long practice. The meaning of courage can also be interpreted as absence of sorrow because of *yogic* practice. Worldly desires are like mirages in deserts. There is no difference between

soul & god. The living being himself is *brahma*, he is truth & this knowledge is *Tatvajñāna or* philosophical knowledge, when a person is enlightened with this, he can attain salvation.

क्रियायुक्तस्य सिद्धिः स्यादक्रियस्य कथं भवेत् । न शास्त्रपाठमात्रेण योगसिद्धि प्रजायते ।।
(ह.यो.प्र.१/६७)

अथनादानुसन्धानमभ्यासानुक्रमो हठे । ब्रह्मचारी मिताहारी त्यागी योगपरायणः ।।
अब्धादूर्ध्वं भवेत् सिद्धो नात्रकार्याविचारणा ।। (ह.यो.प्र. १/५९)

One who performs his deeds can get *siddhi*, otherwise with only reading one can not get the fruits of *Siddhi of Āsana, Prāṇāyāma & Mudra.*

One who practices & thinks about *nāda* (*omkāra rūpa*), follows celibacy, *mitāhāra* & well versed in *yoga*, attains *siddhi* within one year.

विद्यां चाविद्यां च यस्तद् वेदोभय स ह । अविद्यया मृत्युं नीर्त्वा विद्यायामृतमश्नुते ।। (इ.वा.उ.११)

Person having *vidyā rūpa* knowledge & *Avidya rūpa karma tatva*, by that person can conquer death & utilize immortality of knowledge.

Niścaya means faith, faith & devotion towards *śāstra & Guru* can lead to *Yogasiddhi.*

Association with people leads to desire, hatred, jelousy etc. so these when avoided assist Yogasiddhi.

Eight attainments (अष्टसिद्धि)

आवेशश्चेतसो ज्ञानमर्थानां छन्दतः क्रिया । दृष्टिः श्रोत्रं स्मृतिः कान्तिरिष्ट तश्चाप्यदर्शनम् ।।
इत्यष्टविधिमाख्यातं योगिनां बलमैश्वरम् । शुद्धसत्वसमाधानात्तत् सर्वं उपजायते ।।
(च.शा.१/१४०-१४१)

Entering into other persons body, mind reading, controlling sense objects according to will, extra ordinary perception, can see the objects which are not percievable by eyes, can grasp sounds very well even if it is distant, extra ordinary memory, can remember every thing, has extra ordinary lusture & aura, can become visible & invisible at will, these are eight attainments, by the practice of yoga. He can attain invisible form, become very light, attain ultra big size, can get desired things, will power becomes trouble less, gains control over others, can become lord of all physical things, and what ever yogi desires all are available to him.

Aṣṭāṅga yoga (अष्टाङ्गयोग)

यमनियमासन प्राणायामप्रत्याहार धारण ध्यानसामाधयोऽष्टावङ्गानि ।। (प.यो.सू.२/२१)

Yama, Niyama, Āsana, Prāṇāyāma, Pratyāhāra, Dhāraṇa, Dhyānā & Samādhi are 8 parts of *yoga*. Among them first five are called *bahiraṅga* & later called *Antaraṅga yoga*.

Ethical rules (यम)

अहिंसा सत्यमस्तेयं ब्रह्मचर्यापरिग्रहाः यमाः ।। (प.यो.सू.२/३०)

Non violence, truth, non stealing, celibacy & not desiring for other's things are *yamās*.

अहिंसा सत्यमस्तेय ब्रह्मचर्य क्षमा धृतिः।दयार्जवं हिताहारं शौचं च दश यमाः।।(ह.यो.प्र.१/१७)

These are self restrictions or disciplines or ethical discipline or abstinence.

Nonvoilence (अहिंसा)

अहिंसा सर्वथा सर्वदा सर्वभूतानां अनभिद्रोहं ।। (याज्ञवल्क्यसंहिता)

Always not causing harm to any being at any time.

अहिंसा प्रतिष्टया ततसन्निधो वैरत्यागः ।। (प.यो.सू. २/३५)

When the non voilence is adopted, there would be no enemity around.

मनसा वाचा कर्मणा सर्वभूतेषु सर्वदा । अक्लेशजननम् प्रोक्तमहिंसत्वेन योगिभिः ।।

Not producing trouble to any body, at any time by mind, speech or action. That is possible only when one considers all beings as himself i.e. by empathy.

"आत्मवत् सर्वभूतेषु ।"

Truth (सत्य)

सत्य प्रतिष्ठया क्रियाफलाश्रयत्वम् । (यो.द. २/३६)

Who totally believes in truthfulness, the fruit left to action only. Complete belief in truthfullness and fruit of action left to deeds.

सत्यं ब्रूयात् प्रियं ब्रूयात् मा ब्रूयात् सत्यं अप्रियम् । प्रियं च नानृतं ब्रूयात् एषं धर्मः सनातनः ।। (मनुस्मृति)

Always speak truth & speak in a way pleasing to others, but don't speek truth which makes others unhappy. But at the same time don't speak lie to please others. It is rule according to *Manusmṛti*.

Nonstealing (अस्तेय)

अस्तेय प्रतिष्ठायां सर्वरत्नोपस्थानम् ।। (यो.द. २/३७)

On being established with non stealing all kinds of gems present themselves before him.

मनसा वाचा कर्मणा परद्रव्येषु निस्पृहः । अस्तेयमिति संप्रोक्तः ऋषिभिस्तत्वदर्शिभिः ।।
(याज्ञवल्क्य स्मृति)

One who does not desire for other's things mentally, verbally & by action is considered as nonstealing by seers & philosophers.

Celibacy (ब्रह्मचर्य)

ब्रह्मचर्य प्रतिष्ठायां वीर्य लाभः ।। (यो.द. २/३८)

On performing celibacy one conserves energy.

ब्रह्मचर्येण तपसा देवाः मृत्युमपाघ्नतः ।। (अथर्ववेद ११/४/१९)

By celibacy & penance gods attained immortality & godship.

No desire for others wealth (अपरिग्रह)

अपरिग्रहस्थैर्ये जन्मकथंता संबोधः ।। (यो.द.२/३९)

By the practice of Aparigraha, person will be enlightened with the knowlege of past and future birth.

Kindness (दया)

स्वात्मवत् सर्वभूतेषु कायेन मनसागिरा । अनुज्ञया दया सैव प्रोक्ता वेदान्तवेदिभिः ।।

Considering all beings as self by mind, speech & action is called as *Dayā* (kindness) according to *vedantins.*

Honesty (आर्जवम्)

पुत्रे मित्रे कलत्रे च रिपौ स्वात्मानि सन्ततम् । एकरूपं मुने यत्तदार्जवं प्रोच्यते मया ।।

Always considering son, friend, wife and enemy equally by seers is called *Ārjava.*

Forgiving (क्षमा)

कायेन मनसा वाचा शत्रुभिः परिपीडितः । बुद्धि क्षोभ निवृत्तिर्या क्षमा सा मुनिपुङ्गवः ।।

After being troubled physically, mentally & verbally by enemies, at the end of torture forgiving by seers is called as forgiveness or *Kṣamā.*

Courage (धृति)

वेदादेव विनिर्मोक्षः संसारस्य न चान्यथा । इति विज्ञान निष्पत्तिर्धृतिः प्रोक्ता हि वैदिकः ।।
अहमात्मा न चान्योऽस्मित्येवप्रच्युता मतिः ।।

Liberation from this world is possible, only by studying vedas. This knowledge it self is known as courage (Dhṛti). The realisation of soul is Mati.

Niyama (नियम)

These are principles for social well being.

शौचसन्तोषतपः स्वाध्यायेश्वरप्रणिधानानि नियमाः ।। (यो.द. २/३२)

तपः सन्तोषमास्तिक्यं दानं ईश्वरपूजनम् । सिद्धान्त वाक्यश्रवणं ह्रीमती च तपो व्रतम् ।।
नियमाः दश संप्रोक्ता योग शास्त्र विशारदैः ।। (ह.यो.प्र. १/१८)

Cleanliness, happiness, penance, reading philosophical books & praying to god are *niyamās*.

Cleanliness (शौच)

शौचात्स्वाङ्गजुगुप्सा परैरसंसर्ग ।। (प.यो.सू.२/४०)

Cleanliness of body as well as mind is *Śauca*, is very important.

- बाह्य शौच- external cleanliness
- अभ्यन्तर शौच- internal cleanliness.

Contentment (संतोष)

सन्तोषादनुत्तमः सुखलाभः ।। (प.यो.सू.२/४२)

Santoṣa is contentment, without which concentration is difficult. This gives bliss to yogi, which is ultimate happiness.

Penance (तपस्)

कायेन्द्रियसिद्धिरशुद्धिक्षयात्तपसः ।। (प.यो.सू. २/४३)

Penance produces purity of body and senses as well as reduces impurities of mind.

It is of 3 types.

शारीरिक तपस् → ब्रह्मचर्य, अहिंसा

वाचिक तपस् → देवता संकीर्तन, सत्यवचन

मानसिक तपस् → अत्मनिग्रह, समत्व of मनस्

Penance related with body i.e. celibacy, non violence, speech i.e. praying god, truth & penance of mind i.e. control over self & balance of mind.

Self study (स्वाध्याय)

स्वाध्याय प्रणवादि पवित्राणां जपो मोक्ष शास्त्राध्ययनं वा ।। (यो.द. २/१)

स्वाध्यायादिष्ट देवतासं प्रयोगः ।। (यो.द. २/४४)

Chanting *'omkāra'* and reading spiritual texts are means for salvation. A person can unite himself with desired god.

Dedicating to God (ईश्वर प्रणिधान)

ईश्वर प्रणिधानं सर्वक्रियायां परमगुरूवर्पणं तत्फलसंन्यासो वा । (यो.द.२/१)

All deeds performed without any expectation of fruits & devoted to god.

समाधिसिद्धिरीश्वर प्रणिधानात् ।। (यो.द.२/४५)

By dedicating to god, one can attain ultimate *samādhi* i.e. salvation.

तेनविनातृणमपि न चलति ।।

Complete belief in god i.e. without his desire even grass can not move.

रागाद्यपेतं हृदयं वागादुष्टानृतादिना । हिंसादिरहितमं कर्म यत्तदीश्वरपूजनम् ।।

Heart filled without attachment etc. feelings, speaking truth, nonviolence etc good deeds are desired for worshipping god.

Belief in God (आस्तिक्य)

श्रौते स्मार्ते च विश्वासो यत्तदास्तिक्यमुच्यते ।

Belief in *śrti* literature & gods is called as *Āstikya*.

Gifts (दानम्)

न्यायार्जित धनं श्रान्ते श्रद्धया वैदिके जने । अन्यद्वा यत्प्रदीयन्ते तद्दानं प्रोच्यते मया ।।

Money earned with honesty, if given with devotion should be given to those, who are in need & *brahmins* is known as gift (*dāna*)

Listening to vedantas (सिद्धान्त श्रवण)

सत्यज्ञानमनंतं च परानन्दं परं ध्रुवम् । प्रत्यगित्यवगन्तव्यं वेदान्त श्रवणं बुधः ।।

Knowledge is eternal, provides ultimate happiness, which is obtained by listening to the *vedantās*, by the intelligent person.

Shyness (ह्री)

वेदलौकिकमार्गेषु कुत्सितं कर्म यद्भवेत् । तस्मिन् भवति या लज्जा ह्रीः सैवेति प्रकीर्तितः ।।

Shyness towards bad deeds mentioned in *vedas* & worldly paths is called as *Hrī*.

Mati (मतिः)

वैदिकेषु च सर्वेषु श्रद्धा या सा मतिर्भवेत् । गुरुणा चोपदिष्टेपि तत्र सबन्ध वर्जितः ।।

If one has respect towards elders, preceptors & *vedas* is called as *mati*.

Chanting Mantras (जप)

वेदोक्तेनैवमार्गेण मन्त्राभ्यासो जपः स्मृतः ।

Chanting of *mantrās* as mentioned in *vedas* is known as *Japa*.

Chapter- 2

ĀSANA

Āsana is third part of *yoga*, which includes different *yogic* postures, it helps to attain further steps of *yoga*. Control over physical body later leads to control over mind, which enhance all over development of being.

स्थिरं सुखं आसनं ।। (प.यो.सू.२/४६)

Stable and comfortable posture is *Āsana*.

हठस्य प्रथमाङ्गत्वादासनं पूर्वमुच्यते । कुर्यात्तदासनं स्थैर्यमारोग्यं चाङ्गलाघवं । (ह.यो.प्र.१/१९)

Āsana is the first step of *Haṭhayoga*, which produces lightness of the body, enhances strength & health.

Utility of Āsanas & their effects on the health

One can control his mind efficiently, only when he controls his body properly. This is brought about by *Āsanas* & thus help in attaining the ultimate goal the salvation. By practicing *Āsanas* one can develop mental equilibrium, balance, endurance & great vitality.

In the ancient times the seers practiced *yoga* and kept their body in healthy condition & made them live for hundreds of years without any illhealth.

Utility of *Āsanas* can be taken as two folds.

1. Spiritually, it helps in controlling the mind & to attain salvation.

2. Preservation of health & cure of various diseases.

Svastikāsana (स्वस्तिकासन)

जानूर्वान्तरे सम्यक्कृत्वा पादतले उभे। ऋजुकायः समासीनः स्वस्तिकं तत्प्रचक्षते।।(ह.यो.प्र.१/२१)

Method

1. Draw the legs and thighs together.
2. Place the feet below them.
3. Keep the body in comfortable way & sit straight.
4. This posture is called *svastikāsana*

Benefits

1. One of the meditative postures.
2. Relieves the stiffness of the joints.

Gomukhāsana (गोमुखासन)

पादौ च भूमौ संस्थाप्य पृष्ठपार्श्वे निवेशयेत्। स्थिरकायं समासाद्य गोमुखं गोमुखाकृति ।।
(घे.सं.२/१६)

'Go' means cow. *'Mukha'* means face.

Method

1. Sit on the floor with the legs extended to the front.

2. Bend the left knee back & place it next to right thigh

3. Bend the right knee back & place it next to left thigh.

4. Raise the left arm above the head, bend at elbow & place the left palm below the neck. Clamp the hands behind the back between the shoulders.

5. Sit stable in this position for 30 to 60 seconds with the body & neck erect.

6. Release the hands, straighten the legs & repeat the pose on opposite side for same time duration.

Benefits

1. Beneficial in muscle cramps of legs

2. Makes the leg muscles elastic.

3. Chest gets expanded & back becomes straight.

4. Shoulder joints move freely, this enhances mobility.

Indications– Muscle weakness, *Vāta* disorders.

Vīrāsana (वीरासन)

एकं पाद तथैकस्मिन्विन्यसेदुरूणि स्थितम्। इतरस्मिन् स्मथा चोरु वीरासनमितीरितम्।। (ह.प्र.१/२३)

Vīra means hero, warrior or champion. It is good posture for meditation & *prāṇāyāma*.

Method 1–

1. Sit in vajrāsana posture.

2. Raise the right knee & keep the foot besides left knee.

3. Bend the right elbow and place it below the chin.

4. Keep the left palm above the left knee.

5. Keep the head, spine & back erect.

Method 2–

1. Kneel down on the floor and place the knees together & spread the feet about 18 inches away from each other.

2. Rest the buttocks on the floor, but not on the feet. The feets are placed by the side of its respective thigh, keep the toes extended & spine erect.

3. Rest the palms on the respective knees, sit in this position & take deep breath.

Benefits

Beneficial in rheumatic pains in the knees, gout, flat foot. Due to stretching of the ankles & feet, arch of foot is properly formed. It can be done even after taking food to relieve heaviness of stomach.

Kūrmāsana (कूर्मासन)

गुदं विरुद्धत्र गुल्फाभ्यां भ्युत्क्रमेण सताहितः । कूर्मासन भवेदेतदिति योगविदो विदुः ।।

(ह.यो.प्र.१/२१)

Kūrma means tortoise

Method

1. Sit with the knees extended to the front.

2. Fold the right knee & place it below anus, similarly fold the left knee & place it below the anus. Keep the body, head & neck erect.

3. This position is known as *Kūrmāsana* or tortoise position.

Benefits

Helps in rheumatic conditions. Makes the leg muscles elastic.

Kukkuṭāsana (कुक्कुटासन)

पद्मासन संस्थाप्य जानूर्वोरंतरे करौ। निवेश्य भूमौ संस्थाप्य व्योमस्थं कुक्कुटासनम्।।(ह.यो.प्र.१/२५)

Kukkuṭa means hen

Method

1. Perform *Padmāsana* first.

2. Pass the hands in the middle of both the legs & keep the palm over the ground.

3. Lift the body in air, transferring all the weight on the two palms.

4. This posture is known on *Kukkuṭāsana* or hen posture.

Benefits

It strengthens the wrists and abdominal walls.

Uttāna kūrmāsana (उत्तान कूर्मासन)

कुक्कुटासन बन्धस्यो दोर्भ्यां सन्ध्य कन्धराम्। भूवेत्कूर्मवदुत्तान एतदुत्तान कूर्मासनम्।।(ह.यो.प्र.१/२६)

Method

1. One should perform *Kukkuṭāsana* in the beginning.

2. Then hold the neck by the respective hands from behind.

3. Be erect as the tortoise. This is called as *Uttāna kūrmāsana.*

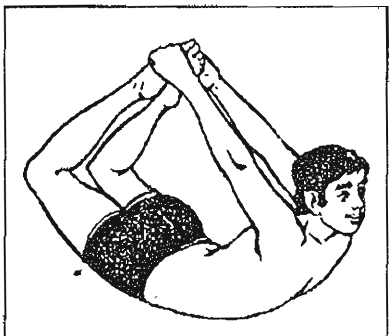
Benefits

1. By this abdominal organs are contracted completely.

2. Blood circulation to the abdominal organs get enhanced.

3. Increases strength of abdominal muscles.

Dhanurāsana (धनुरासन)



Dhanurāsana

पादांगुष्ठौ तु पाणिभ्यां गृहीत्वा श्रवणावधि । धनुराकर्षणं कुर्याद्धनुरासनमुच्यते।।(ह.यो.प्र.४/२७)

'Dhanu' means bow'

Method

1. Lie in the prone position with legs extended.

2. Bend the legs at knee joint, hold the ankles with the respective hands.

3. Exhale fully & pull the legs up, by raising the knees above the floor & simultaneously lift the chest above the ground.

4. Lift the head up & pull it back to the maxinum.

5. While raising the legs, knees should not join one another.

6. With exhalation release the ankles, stretch the legs straight, keep the head & legs on the floor & relax.

Benefits

Spine is stretched back, so brings back the elasticity to the back & stimulates the abdominal organs. Beneficial in low back ache, slip disc, strengthens the abdominal muscles & reduces abdominal fat.

Matsyendrāsana (मत्स्येन्द्रासन)

वामोरुमूलार्पितदक्षपादं जानोर्बहिष्टितवामपादम् । प्रगृह्य तिष्ठेत्परिवर्तिताङ्गः श्रीमत्स्यनाथोदित-मासनंस्वात् ।। (ह.यो.प्र. १/२८)

Method

1. Sit with the legs stretched forwards on the ground.

2. Bend the left leg at knee, place the sole & heal of left foot on the floor.

3. With exhalation turn the spine about 90° to the left, so that right arm pit touches the outer side of right thigh.

4. Place the right shoulder beyond the left knee & stretch right arm forwards.

5. Exhale, move the right arm around the left knee, bend the right elbow & place the right hand at the back of the waist.

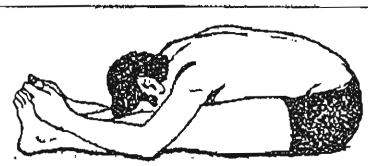
6. With deep exhalation, twist the left arm from the shoulder behind the back & clasp the right hand behind the back with the left hand.

Benefits

Pressure of the heels against the naval & clasping of the hands behind the back, stimulates the nerves around the umbilicus. It tones liver, spleen and pancreas & calcium deposits in the shoulder joints is resolved. The movements of the shoulder joint becomes free. It enhances the digestive fire and helps to awaken *Kuṇḍalinī* power. Gives moon power to man.

Paścimottānāsana (पश्चिमोत्तानासन)

प्रसार्य पादौ भुवि दण्डरूपौ दोर्भ्यां पदाग्रद्वितयं गृहीत्वाः । जानूपरिन्यस्तललाटदेशो वसेदिदं पश्चिमतानमाहुः ।। (ह.यो.प्र. १/३०)



Paścimottānāsana

Methods

1. Sit straight with the legs extended to the front.

2. Hold the great toes of foot with respective hands.

3. With exhalation bend forwards & touch the head to the knee joint.

4. The elbows should touch the ground.

5. Be in this position for 30 to 60 seconds

6. Release the hands & with exhalation come back to the earlier posture.

Benefits

1. Beneficial in defects of *prāṇa vāyu.*

2. Enhances digestive power.

3. Reduces the abdominal fat.

4. Provides health.

5. Tones up the abdominal organs like kidney, liver, spleen etc.

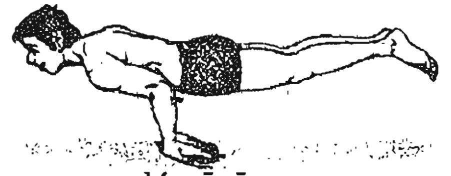
6. Strengthens the spine.

7. Pose massages the heart.

8. It increases vitality & helps to cure impotence & gain control over sex.

Mayūrāsana (मयूरासन)

धरामवष्टभ्य करद्वयेन तत्कूर्परस्थापितनाभिपार्श्वः ।
उच्चासनो दण्डवदुत्थितः स्यान्मायूरमेतत्प्रवदन्ति पीठम् ।। (ह.यो.प्र. १/३२)



Mayūrāsana

Māyūra is Peacock

Method

1. Kneel down on the ground with the knees slightly apart.

2. Bend forward, place the palms with fingers positioning back & place them on the ground.

3. Bend the elbows & place the fore arms together. Rest the abdomen on the elbows & the chest on the posterior aspect of the upper arms.

4. Extend the legs straight one by one & place them together & stiff.

5. Exhale, transfer the body weight on the wrists & hands, lift the legs from the floor, simultaneously stretch trunk & head forwards. Keep the body parallel to the ground.

6. Then slowly lower the body on the ground & come to the earlier position.

Benefits

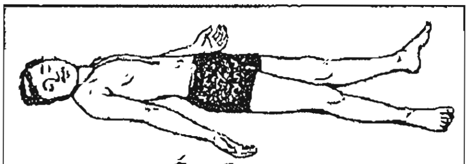
1. Tones up the abdominal part of the body.

2. Due to pressure of the elbow against the abdominal aorta blood circulation enhances.

3. Prevents accumulation of toxins, cures ailments of stomach & spleen.

4. Enhances the strength of fore arms, wrists & elbows.

Śavāsana (शवासन)



Śavāsana

उत्तानं शववद्भूमौ शयनं तच्छवासनम्। शवासनं श्रान्तिहरं चित्त विश्रान्तिकारकम्।।(ह.यो.प्र.१/३४)

Lying down on the ground in the supine position like a dead body is *Śavāsana*. This relives tiredness & mental tensions.

Benefits

1. Soothening effect on the body.
2. Relaxes the body completely.
3. Calms the mind & reduces the tensions.

Four most important Āsanas

सिद्धं पद्मं तथा सिंहं भद्रं चेति चतुष्टयम् । श्रेष्ठं तत्रापि च सुखे तिष्ठेत् सिद्धासने सदा ।।

(ह.यो.प्र.१/३६)

Siddhāsana, Padmāsana, Simhāsana & Bhadrāsana are four most important *Āsanas*. *Siddāsana* is the most important among them, so always one should sit in *siddhāsana* comfortably.

Siddhāsana (सिद्धासन)

योनिस्थानकमंघ्रिमूलघटितं कृत्वा दृढं विन्यसेत् । मेढ्रे पादमथैकमेव हृदये कृत्वा हनुं सुस्थिरम् ।।
स्थाणुः संयमितेंद्रियोऽचलदृशा पश्येत् भ्रुवोरन्तरं । ह्येतन्मोक्षकपाट भेजदनके सिद्धासनं प्रोच्यते ।।

(ह.यो.प्र. १/३७)

Method

1. Sit on the ground with the legs stretched to the front.

2. Flex the left leg at the knee. Hold the left foot with the hands, keep the heel near the perineum & keep the sole of the left foot against the right thigh.

3. Flex the right leg at the knee & keep the right foot over the left ankle, keeping the right heel against the pubic bone.

4. Keep the sole of the right foot between the thigh & the calf of the left leg.

5. Do not rest the body on heels.

6. Sit in Jñāna mudra.

7. Sit in the position comfortably for some time & then come to the earlier position.

Benefits

1. The position keeps the pubic region healthy.
2. One of the most relaxing position.
3. Crossed legs, erect back, keeps the mind attentive & alert.
4. Best posture for *prāṇāyāma* & meditation.
5. Relieves stiffness of knees & ankles.
6. Tones up the lower region of spine & abdominal organs.

Padmāsana (पद्मासान)

वामोरुपरि दक्षिणं च चरणं संस्थाप्य वामं तथा।दक्षोरुपरि पश्चिमेन विधिना धृत्वा कराभ्यां दृढम् ।।
अंगुष्ठौ हृदये निधाय चिबुकं नासाग्रमालोकयेत् । एतद्व्याधिविनाशकारि यमिनां पद्मासनं प्रोच्यते ।।
(ह.यो.प्र. १/४६)



Padmāsana

Method

1. Sit on the ground with the legs stretched.

2. Bend the right leg at the knee & keep it on the root of left thigh, so that right heel is near the umbilicus.

3. Bend the left leg at the knee & keep it on the root of right thigh & heel near the umbilicus.

4. Sit in the position comfortably with hands placed one above the other.

5. Back, neck & body should be straight.

6. Change the position of the legs after some time & perform the posture with opposite way.

Benefits

1. Best posture for meditation & *Prāṇāyāna*.
2. Makes the mind attentive & alert.
3. Helps to arose *Kuṇḍalinī* power.
4. Beneficial in curing stiffness of knees & ankles.
5. Enhances blood circulation in lumbar & abdominal region.
6. Tones up the spine & abdominal organs.

Simhāsana (सिंहासन)

गुल्फौ च वृषणस्याधः सीवस्य पार्श्वयोः क्षिपेत् । दक्षिणे सव्य गुल्फं तु दक्षगुल्फं तु सव्यके ।।
हस्तौ तु जान्वोः संस्थाप्य स्वांगुलोः संप्रसार्य च । व्यात्तवक्रो निरीक्षेत नासाग्रं सुसमाहितः ।।
सिंहासनं भवेदेतत्पूजितं योगिपुङ्गवैः। बन्धत्रितयसंधानं कुरुते चासनोत्तमम्।।(ह.यो.प्र.१/५२-५४)

Method

1. Sit on the ground with the legs stretched.

2. Lift the seat, bend the right knee & keep the right foot under the left buttock, similarly bend the left knee & keep the left foot below the right buttock.

3. Sit on the heels with the toes pointing to the back.

4. Stretch the body forwards & keep the back straight.

5. Place the palms on the respective knees & open the mouth widely, extend the tongue out.

6. Eyes should gaze to the centre of the eyesbrows, stay in this position for 30 seconds & breath through mouth.

7. Withdraw the tongue, slowly straighten the legs and come back to the earlier position.

Benefits

1. Cures bad odour of breath & cleans the tongue.

2. The speech becomes cleaner & helpful in stammering.

3. Helps in mastering three *bandhas*.

4. Helps in enhancing concentration.

Bhadrāsana (भद्रासन)

गुल्फौ च वृषणस्याधः सेवन्याः पार्श्वयोः क्षिपेत् । सव्यं गुल्फं तथा सव्ये दक्षगुल्फं तु दक्षिणे ।।
पार्श्वपादौ च पाणिभ्यां दृढ़ बद्ध्वा सुनिश्चलम् । भद्रासन भवेदेतत्सर्वव्याधि विनाशनम् ।।
(ह.यो.प्र.१/५५-५६)

Method

1. Sit with the legs stretched forwards.

2. Bend the right knee & keep the right foot below the left part of genitals, similarly bend the left knee & keep the left foot below the right part of the genitals.

3. Cross the hands towards the back & hold the toes of the feet.

4. Sit comfortable & stable.

Benefits

1. Destroys all sorts of diseases.

2. Improves the mobility of joints.

3. Strengthens the upper extrimity.

4. Stretches the chest.

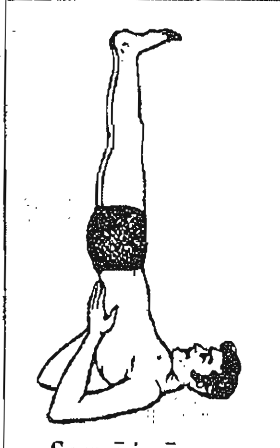
Sarvāṅgāsana (सर्वांगासन)

'Sarva' means all, *'aṅga'* means parts ie. all the body parts are exercised by this posture.

Method

1. Lie flat in supine position keeping the legs stretched

2. Exhale, bend the knees & move the legs towards the abdomen till the thighs touch it.


Sarvāṅgāsana

3. Lift the hips from the floor with exhalation & rest the hands on them by bending the elbows.

4. Exhale & lift the trunk up perpendicular to the ground & straighten the knee joints.

5. Only back of the head, neck & shoulders & back of the arms should rest on the ground.

6. Stay in this posture for some time & gradually slide down, release the hands & lie flat & relax.

Benefits

1. Beneficial in several endocrine gland anamalies.

2. Enhances blood circulation & nutrient absorption.

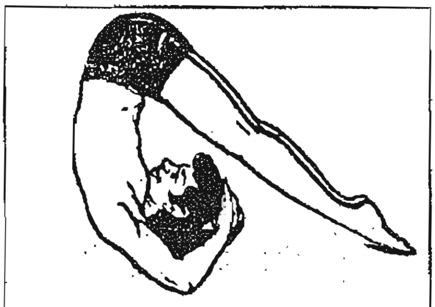
3. Beneficial in breathlessness, palpitation, asthma, bronchitis and throat ailments.

4. It relaxes the nerves, so beneficial in chronic head aches.

5. Beneficial in irritation, short temper, common cold & insomnia.

6. It is also beneficial in urinary disorders, uterine problem, piles & hernia.

Halāsana (हलासन)


Halāsana

'Hala' means plough and *'Āsana'* is posture.

Method

1. Lie flat on the ground.

2. Keep the legs straight, exhale slowly & raise the legs perpendicular to the ground.

3. Exhale again, raise the hips & back, supporting the waist with the palms, keep the chin on the breast bone.

4. Release the chin lock, further touch the ground with the toes & move the hands above the head to touch the feet.

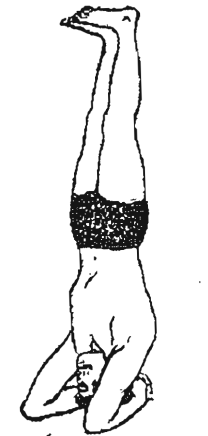
5. Remain in this posture for some time.

6. Release the hands, raise the legs as in *sarvāṅgāsana* & gradually bring the body to floor, lie flat in the ground & relax.

Benefits– Same as that of *sarvāṅgāsana.*

Beneficial in back ache, cramps, stiffness in shoulders & arthritis.

Śīrṣāsana (शीर्षासन)



Śīrṣāsana

भूमौ स्वमस्तकं स्थाप्य हस्तयोः कूर्परे तथा । पादौ खे दण्डवत् कुर्यात् कपालासनमीरितम् ।। (यो.सि.च. २८)

Method

1. Sit on the knees, bend forward & rest the fore arm & elbow on the ground.

2. Interlock the fingers & rest the head on the ground, touching the palms.

3. Move the knee joint towards the head.

4. After attaining the head position, raise the knees from the floor by moving the legs closer to the head.

5. Exhale, take a swing from the ground & raise the legs off the ground with bent knees.

6. Extend the legs & balance on the head, keeping the whole body perpendicular to the ground.

7. After some time, slowly bring the legs down & keep it on the ground & then come back to the earlier posture.

Benefits

1. Enhances the pure blood circulation through brain.

2. Enhances thinking & memory power.

3. Enhances blood supply to pituitary & pineal glands, which are responsible for growth, vitality & health.

4. Beneficial in loss of sleep, cold, cough, tonsililis, halitosis, palpitation and constipation.

Pavanamuktāsana (पवनमुक्तासन)

'Pavana' means air *'mukta'* means relief. The *āsana* which helps to alleviate *Vāta* is known as *Pavanamuktāsana.*

Method

1. Lie down in the supine position.


Pavanamuktāsana

2. Slowly bend the knees with inhalation, bring the thighs above the abdomen & place it on the stomach, so that it presses the abdomen below.

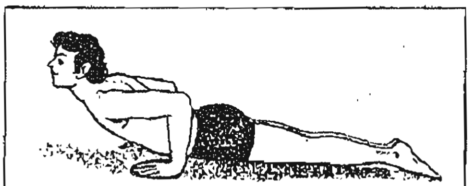
3. Encircle the upper arms below the knee joint & slowly lift the head & upper part of the back above the ground with exhalation.

4. Remain in the position for some time & slowly release the hands & come back to the earlier position.

Benefits

1. Strengthens the abdominal muscles.
2. Helps to relieve the gaseous distension of abdomen.
3. Helps to reduce the fat from the belly.
4. Useful in Diabetes & Hypertension.

Bhujaṅgāsana (भुजङ्गासन)


Bhujaṅgāsana

'Bhujaṅga' means snake & *'āsana'* is posture.

अङ्गुष्ठनाभिपर्यन्तमधोभूमौ विनिन्यसेत् । करतलाभ्यां धरां धृत्वा ऊर्ध्वशीर्षः फणीव हि ।।
देहाग्निर्वर्द्धते नित्यं सर्वरोगविनाशनम् । जागर्ति भुजगी देवी भुजगासन साधनात्।।(घे.सं. २/४२-४३)

Methods

1. Lie down in the prone position on the ground.
2. Extend both the legs & toes pointing backwards.
3. Keep the palms by the side of waist.
4. Inhale & lift trunk up like the hood of serpent. The weight should be on legs & palms.
5. Maintain this position for some time.
6. Exhale, bend the elbow & place the body on the ground slowly.

Benefits

1. Beneficial in low back aches, slight displacement of disc.
2. Spinal region gets strengthened & chest gets expanded.
3. Helps to reduce the fat in the belly.

Śalabhāsana

'Śalabha' means 'locust' a type of insect. The posture resembles locust on the ground.

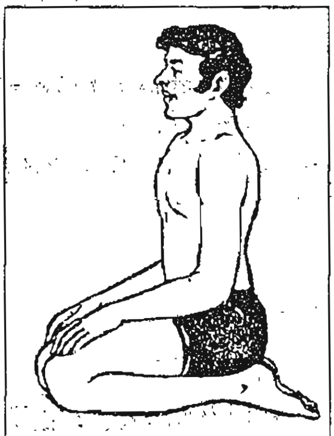
Method

1. Lie on the ground in prone position, with the legs stretched & the hands besides the body.
2. Exhale & lift the head, chest & legs off the ground.
3. Stiffen the knees & buttock, so that abdomen supports the body.
4. Stay in this position with normal breathing.
5. Gradually bring back the legs & body to prone position with exhalation.

Benefits

Helpful in indigestion, gastric troubles & flatulence. Gives elasticity to back bones & relieves lumbago. It is beneficial even in disc prolapse.

Vajrāsana



Vajrāsana

'Vajra' means Diamond & *Āsana* is posture.

जङ्घाभ्यां वज्रवत्कृत्वा गुदपार्श्वे पदावुभौ । वज्रासनं भवेदेतद्योगिनांसिद्धिदायकम् ।। (घे.सं.२/१२)

Tighten the thighs like the diamond & knees & the feet by the sides of anus. This is *Vajrāsana* which gives *siddhi* to *yogis*.

Method

1. Sit erect with the legs straight.
2. Bend at the knees and place it by the sides of thighs.
3. Tighten the thigh, and breath normally.
4. This is the posture, which can be practiced even after taking meals.

Benefits

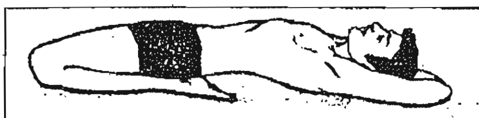
Relieves stiffness in the joints. Helps in improving the concentration.

Suptavajrāsana (सुप्तवज्रासन)

'Supta' means lying down *'Vajra'* means lightening.

Method

1. Sit in *vajrāsana* posture. Then cross the upper extremity & hold the greater toe from behind as in *baddha padmāsana*.



Suptavajrāsana

2. Exhale, lift the knee & thighs from the ground & bend back wards.

3. Stretch the neck & touch the head on the ground.

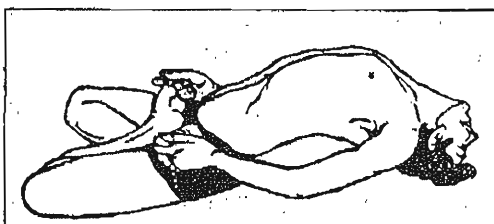
4. Without releasing the toes, slowly keep the thighs on the ground. Be in this pose for some time.

5. Then slowly release the hands & sit up in Vajrāsana again.

Benefits

1. Dorsal region gets stretched fully.
2. Chest gets expanded.
3. Beneficial in Thyroid abnormality.
4. Pelvic joints become more elastic.

Matsyāsana (मत्स्यासन)



Matsyāsana

मुक्तं पद्मासनं कृत्वा उत्तानशयनाचरेत्। कूर्पराभ्यां शिरोवेष्ट्य मत्स्यासनं तु रोगद्य ।।(घे.सं.२/२१)

'Matsya' means 'fish' & *'āsana'* is posture.

Method

1. Sit in *Padmāsana.*

2. Lie flat on the back on the ground. Thighs should touch the ground.

3. Exhale, arch the back by lifting the neck & chest. Rest the head on the ground.

4. Hold the crossed leg with the hands & drag the head still further.

5. Stay in this position for some time.

6. Gradually rest the head & back on the floor. Inhale & come up back to padmāsana.

7. Repeat this process with the opposite legs.

Benefits

1. Chest gets expanded. 2. Beneficial in thyroid problems.

3. Enhances the elaslicity of pelvic joints.

4. Helps to reduce fat around belly & waist.

Yogāsana (योगासन)

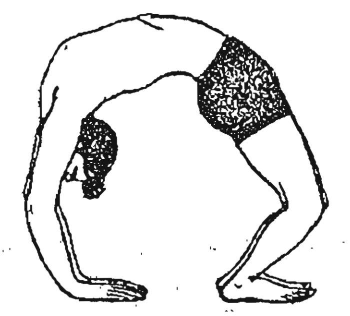
उत्तानौ चरणं कृत्वा संस्थाप्य जानुनोपरि । आसनोपरि संस्थाप्य उत्तानं करयुग्मकम् ।।
पूरकैर्वायुमाकृष्य नासाग्रमवलोकयेत्। योगासनं भवेदेतद्योगिनां योगसाधने ।।(घे.सं.२/४४-४५)

Sit with legs extended to the front. Turn the feet upwards & place them over the knees. Then place the hands on the ground with the palms turned upwards. Inspire & fix the gaze on the tip of the nose. This is called an *yogāsana,* which helps in the path of *yoga*.

Benefits

1. Helps in concentration. 2. Helps to release the stiffness of joints.

Cakrāsana (चक्रासन)



Cakrāsana

'Cakra' means circle, *'āsana'* is posture.

Method

1. Lie down on the floor in supine position.

2. Bend the knee joint & bring the feet as near to buttocks as possible.

3. Lift the hands & place the palms behind the head.

4. Lift the body up with inhalation, support the body only on the palms & the foot.

5. Remain in the position for some time.

6. Slowly bring back the body on the ground, with inhalation, extend the knees, bring back the hands besides & relax.

Benefits

1. Tones up the spine & abdominal organs.

2. Strengthens the hands & the thighs.

3. Expands the chest.

4. Stimulates the endocrine glands & *prāṇā śakti.*

Sūrya Namaskāra

Sūrya namaskāra is the combination of several postures along with regulated breathing.

हिरण्मयेन प्रात्रेण सत्यस्यापिहितं मुखं । तत् त्वं पूषन् अपावृणु सत्यधर्माय दृष्टये ।। (ई.वा.उ.१५)

O sun you are like a lid covering the golden vessel containing truth. So kindly open the entrance, enlighten me & lead me towards truth & virtuous acts.

Method– There are 12 posture in one cycle of *sūrya* Namaskāra. Appropriate *bīja mantra* (incantations) are chanted, while performing them.

१. ॐ ह्रां मित्राय नमः ।

Praṇāmāsana– Stand erect with palms together & legs together.

Hastautthānāsana– Take the hands above the head & bend the trunk backwords, inhaling completely.

२. ॐ ह्रीं रवये नमः ।

Pādahastāsana– Bend the body to the front & touch the fore head to knees, with complete exhalation, keep the palms on the floor on either sides of the leg.

३. ॐ ह्रूं सूर्याय नमः ।

Aśvasañcālāsana– Take the right leg back, take the left knee forwards, look up & inhale. Touch the thingh with the heal.

४. ॐ ह्रैं भानवे नमः ।

Parvatāsana– In the next step, take the left leg back resting only on palms & toes. Keep the body strainght with an inclination of 30^0 on the ground & exhale completely.

५. ॐ ह्रौं खगाय नमः ।

Now bend at knee & rest the knees on the floor, without altering the positions of the palms & knees. Rest the fore head on the ground. Inhale completety while moving backwards & then exhale completely.

६. ॐ ह्रः पूष्णे नमः ।

Aṣṭāṅga namaskāra– Without moving the hands & toes, come forwards on the chest & rest the forehead. In this position with *sāṣṭāṅga namaskāra* ie forehead, chest, hands, knees & legs ie all the 8 organs are touching the ground. Buttocks should be kept raised.

७. ॐ ह्रां हिरण्य गर्भाय नमः ।

Bhujaṅgāsana– Inhale, raise the head & trunks making the spine concave upwards, without changing the position of the hands & feet. Keeping the knees off the ground.

८. ॐ ह्रीं मरीचये नमः ।

Exhale, raise the buttocks push the head down & have a complete arch with the heal touching the ground & palms on the floor.

९. ॐ ह्रूं आदित्याय नमः ।

Same as 5th step. Inhale & exhale.

१०. ॐ ह्रैं सवित्रे नमः ।

Inhale & bring the right leg in between 2 hands & in line with them. Arch the back concave upwards as in step 3.

११. ॐ ह्रौं अर्काय नमः ।

Exhale & bring the left foot forwards to the right foot & touch the knees with forehead as in step 2.

१२. ॐ ह्रः भास्कराय नमः ।

Inhale, come up, stand erect with hands along with the body & relax.

Pathyāpathya during the practice of Yoga (योगे हिताहार)

पुष्टं सुमधुरं स्निग्धं गव्यं धातुप्रपोषणम्। मनोभिलषितं योग्यं योगी भोजनमाचरेत्।।(ह.यो.प्र.१/६५)

Nourishing, sweet, unctous food, milk products which enhance *dhātus* and bring about pleasentness in mind are ideal for *yogi.*

गोधूमशालियवषष्ठिकशोभनान्नं क्षीराज्यखण्डनवनीत सितामधूनि ।
शुण्ठीपटोलकफलादि पञ्चशाकं मुद्गादि दिव्यमुदकं च योगीन्द्र पथ्यं ।। (ह.यो.प्र. १/६४)

Wheat, rice, barley, milk, ghee, sugar candy, butter, honey, ginger, snake gaurd, five vegetables, green gram & pure water are good for *yogi.*

आहार शुद्धौ सत्व शुद्धिः ।।

Pure food brings about purity of mind.

Proper amount of food (मिताहार)

सुस्निग्धमधुराहारश्चतुर्थांशविवर्जितः। भुज्यते शिवप्रीत्यर्थैमिताहारः स उच्यते।।(ह.यो.प्र.१/६०)

Unctous, sweet food taken 3/4th of ones capacity, to ones satisfaction is called mitāhāra.

Unwholesome food for yoga practitioner (योगे अहित आहार)

कट्वम्लतीक्ष्णलवणोष्णहरीतशाकसौवीरतैलतिलसर्षपमद्य मस्त्याकु ।
अजादिमांसदधितक्रकुलत्थकोलपीण्याकहिङ्गुलशुनाद्यमपथ्यमाहु ।।
भोजनमहितं विद्यात्पुनरस्योष्णीकृतं रूक्षम् ।
अतिलवणाम्लयुक्तं कदशन शाकोत्कट वर्ज्यं । वन्हि स्त्रीपथिसेवनामाहौ वर्जनमाचरेत् ।।
(ह.यो.प्र.१/६३-६९)

Pungent, sour, salt, green vegetables, *souvīra* kind of fermented product, mustard, sessame oil, fish & rat flesh, goat's meat, curds, butter milk, horse gram, jujube fruit, oil cake, asfoetida and garlic are not conducive for *yogi.*

Food which has been made hot repeatedly, dry, excessively salty & sour is also harmful. Cohabitation with female should be avoided.

Chapter- 3

PRĀṆĀYĀMA

Word *'Prāṇāyāma'* is made up of two wards *'Prāṇā'* & *'āyāma'*. *'Prāṇā'* means breath, respiration, life, vitality, wind, energy or strength. *'Āyāma'* means lengthen, expand, stretch or restraint. This indicates the control over the breath.

तस्मिन् सति श्वास प्रश्वासयोर्गति विच्छेदः प्राणायामः ।। (प.यो.सू. साधनापाद ४९)

After the mastery over the *āsana*, controlling the inspiration & expiration is known as *Prāṇāyāma*. One should consume wholesome diet while doing *Prāṇāyāma. Prāṇāyāma* helps to establish control over the mind & thus helps in the mastery of other *aṅgās* of *yoga*.

चले वाते चलं चित्तं निश्चले निश्चलं भवेत् । योगी स्थाणुत्वमाप्नोति ततो वायुः निरोधयेत् ।।
(ह.यो.प्र.२/२)

When *Prāṇavāyu* is moving, even the mind will be unstable. When *Prāṇavāyu* attains stability, even the mind becomes stable. When both *Vāyu* & mind become stable, then only *yogi* can attain *sthāṇutva*. So one should control the *vāyu* through *Prāṇāyama* process.

बाह्याभ्यन्तरस्तम्भवृत्तिर्देशकालसंख्याभिः परिदृष्टो दीर्घसूक्ष्मः ।। (प.यो.सू साधनापाद ५०)

The control is over all the functions of breathing.

1. *Bāhyavṛtti* or *Recaka* or expiration or emptying the lungs.

2. *Abhyantaravṛtti* or *Pūraka* or inspiration or filling up the lungs.

3. *Stambhavṛtti* or *Kumbhaka* or withholding breath. Consideration should be given to place, time & number of *Prāṇāyāma* & also about number i.e. First, second & third *Prāṇāyāma*.

Kumbha is pot. It can be totally emptied or completely filled with water. Here lungs have been compared to pot. *Kumbhaka* is of two types.

1. *Abhyantara kumbhaka/Antarkumbhaka*– with holding the breath in full inspiration.

2. *Bāhya kumbhaka*– with holding the breath in complete expiration.

Always *kuṁbhaka* should be practiced after proper practice.

Malaśodhana effect of Prāṇāyāma

मलाकुलासु नाडीषु मारुतो नैव मध्यगः । कथं स्यादुन्मनीभावः कार्यसिद्धिः कथं भवेत् ।। शुद्धिमेति यदा सर्वं नाडीचक्रं मलाकुलम्। तदैव जायते योगी प्राणसंग्रहणे क्षमः।।(ह.यो.प्र.२/४-५)

The free movement of *Prāṇa* is not possible through the channels filled by waste & in this condition attainment of *Unmanī bhāva* is not possible & thus *siddhi* is not possible.

When the channels become purified along with the *Cakra,* then *yogi* will be capable of enhancing *prāṇa.* All the nāḍis get purified by the intake of conducive foods & practice *prāṇāyāma.*

Time for the pactice of Prāṇāyāma

प्रातर्मध्यं दिने सायमर्धरात्रे च कुंभकान् । शनैरशीतिर्यंतं चतुर्वारं समभ्यसेत् ।। (ह.यो.प्र.२/११)

Morning, mid afternoon, evening & mid night are the time ideal for practice of Prāṇāyāma, one should gradually practice prāṇāyāma upto 80 cycles.

Features according to Avara, Pravara Madhya Krama

कनीयसि भवेत्स्वेद कम्पो भवति मध्यमे । उत्तमे स्थानमाप्नोति ततो वायु निबन्धयेत् ।।(ह.यो.प्र.२/१२)

In inferior (*Kaniṣṭha*) *prāṇāyāma* sweat is produced, mediocre (*madhyama*) *prāṇāyāma* tremor is produced & in superior (*uttama*) *prāṇāyāma* control over *vāyu* is achieved. In *uttama prāṇāyāma vayu* reaches *brahmarandhra* which is best seat. But this is very difficult task.

Sudation action of Prāṇāyāma

कनीयसी भवेत् स्वेदः ।। (ह.यो.प्र. २/१२)

In inferior *prāṇāyāma* sweat is produced.

जलेन श्रमजातेन गात्रमर्दनमाचरेत् । दृढता लघुता चैव तेन गात्रस्य जायते ।। (ह.यो.प्र.२/१३)

Tiredness produced due to *prāṇāyāma* induces sweating. If one massages over the body with the sweat produced, induces sturdiness & lightness in the body.

Conducive food during the practice of Prāṇāyāma

अभ्यास काले प्रथमे शस्तं क्षीराज्यभोजनम् । ततोऽभ्यासे दृढीभूमे ना तादृङ्नियमग्रहः ।।

(ह.यो.प्र.२/१४)

During the practice of *Prāṇāyāma,* one should consume milk & ghee & then take meals. After prolonged practice, this is not compulsory. The food consumed should be *sātvika* in nature.

Prohibited foods during Prāṇāyāma practice

कट्वम्लं लवणं तिक्तं भृष्टं च दधि तक्रकम् । शाकोत्कटं तथा मद्यं तालं च पनसं तथा ।।
(घे.सं.५/२३)

In the beginning of *yoga* practice one should avoid pungent, sour, salt, bitter, roasted things, curds, butter milk, heavy vegetables, alcohol, palm & over ripened jack fruit.

Results of proper prāṇāyāma practice

प्राणायामादि युक्तेन सर्वरोगक्षयो भवेत् ।। (ह.यो.प्र. २/१६)

If *prāṇāyāma* is practiced in a proper way, it is capable of curing all the diseases.

प्राणायामं ततः कुर्यान्नित्यं सात्विकया धिया । यथा सुषुम्नानाडीस्था मलाः शुद्धिं प्रयान्ति च ।।
(ह.यो.प्र.२/६)

One should practice *prāṇāyāma* regularly with *sātvika* mind, so that the morbid matter present in *suṣumnā nāḍī* gets purified & the flow of *prāṇa* through it becomes regulated.

Results of improper practice of prāṇāyāma

अयुक्ताभ्यासयोगेन सर्व रोग करो भवेत् । (ह.यो.प्र. २/१६)

Improperly practiced *prāṇāyāma* leads to the onset of all kinds of diseases.

यथा सिंहो गजो व्याघ्रो भवेद्वश्यः शनैः शनैः । तथैव सेवितो वायुरन्यथा हन्ति साधकम् ।।
(ह.यो.प्र.२/१५)

The lion, elephant & tiger can be gradually brought under control, similarly the *prāṇāvāyu* can be controlled gradually, otherwise it destroys the practitioner.

Diseases produced by improper practice of prāṇāyāma

हिक्का श्वासश्च कासश्च शिरःकर्णाक्षिवेदनाः । भवन्ति विविधा रोगाः पवनस्य प्रकोपतः ।।
(ह.यो.प्र.२/१७)

Due to the aggravation of *vāta* the diseases like Hiccough, dyspnoea, cough, headache, ear ache & pain in the eyes are produced.

Ideal way of controlling prāṇa vāyu

युक्तं युक्तं त्यजेद्वायु युक्तं युक्तं च पूरयेत् । युक्तं युक्तं च बध्नीयात् एवं सिद्धिमवाप्नुयात् ।।
(ह.यो.प्र.२/१८)

One should gradually exhale, inhale & with hold the *prāṇā vāyu* & thus can achieve control over *prāṇāvāvu* through *prāṇāyāma*.

Features of Nāḍīśuddhi

यदा तु नाडीशुद्धिः स्यात्तथा चिह्नानि बाह्यतः । कायस्य कृशता कान्तिस्तदा जायेत निश्चितम् ।।
यथेष्ट धारण वायोरनलस्य प्रदीपनम् । नादाभिव्यक्तिरारोग्यं जायते नाडीशोधनात् ।।
(ह.यो.प्र.२/१९-२०)

Purification of channels of the body produce following internal & external features. They are leanness of the body, enhanced lusture, increased *agni* due to withholding of *Vāyu*, perception of resonance & good health.

यावद्वायुः स्थितो देहे तावज्जीवनमुच्यते । मरणं तस्य निष्क्रान्तिस्ततो वायुं निरोधयेत् ।।
(ह.यो.प्र.२/३,४)

The person is said to be alive till the *prāṇa vāyu* is present in the body. As soon as the *prāṇa vāyu* goes out, he is said to be dead. So one should learn to control *prāṇa vāyu* through *prāṇāyāma* to enhance the longevity of life.

Physiological changes

1. Although the lung volume is not increased more than deep breathing, the lung ventilation & lung circulation ratio improves. This has led to increased out put by about 20%. Improvements of respiratory efficiency is now a well documented fact. (Bole et al. 1971-72, Nayar 1975, Ghacote and Gau 1981, Gopal et al. 1975).

2. The pulling upwards by the exercise of peritoneal muscles keeps the thoracic diaphragm pushed up to a high level, there by reducing the dead space volume of the lungs.

3. *Prāṇāyāmic* exercises bring about integration of involuntary (ANS) mechanism, improves postural tone and balance with higher cortical centres, that are under voluntary control. Daily 8 to 10 rounds of controlled breathing sets up a cortical neural activity, which becomes operational in influencing or controlling many involuntary or ANS activities.

(5) Since *prāṇāyāma* involves a lot of attention and concentration of mind followed by an initiation of relaxed emotional state.

(6) Following few *prāṇāyāmic* breathing, the CO_2 tension in the exhaled air and in the alveoar air increases. This rise gradually helps the person to get accostomed to higher concentration of CO_2 in the blood. The higher level of CO_2 stimulates cerebral and cardiac circulation (Ganguly and Ghacote 1974, Ghaeote 1982, Selva murthy 1983).

(7) Prāṇāyāma increases vital capacity of lungs.

(8) A longer time unit of *prāṇāyāma* was not found more advantageous as far as elimination of CO_2 and absorption of O_2 is concerned.

(9) During *Kuṁbhaka Uḍḍiyāna or Jālandara Bandha* there is slowing down of heart rate.

(10) The *Āsanas* are primarily involved with postural reflexes, which are mediated by subcortical centres (medulla, pons, cerebellum, basal ganglion) that are under inhibitory control of cortical areas of brain. The greater repeatation and habituation, the less would be the involvement of thalamo cortical circuits, through ascending reticular system.

(11) The topsy turvy postures (*Sarvāṅgāsana, śīrṣāsana*) not only relieve antigravity muscles and help the drainage of venous blood towards the head, but are also supposed to help in proper positioning of viscera, which often show sign of visceroptosis, hernia.

(12) Relaxed state of skeletal muscles in some *yogāsanās*, when intra abdominal pressure is consciously raised by 10-80 mm Hg, it is pressumed to have good effect on blood circulation to viscera or remote internal areas of body.

Nāḍīśodhana Prāṇāyāma/mala śodhana Prāṇāyāma

'Nāḍī' is a tubular organ of the body like an artery or vein through which *prāṇic* energy flows. *'Śodhana'* is the process of purification. By the Practice of this *prāṇāyāma* flow of *prāṇic* energy is set right, which is impaired.

Method

1. Sit in *Padmāsana, Siddhāsana, Vajrāsana or Sukhāsana* with the spine erect.

2. Perform *Jālandhara bandha* & keep the hands in *jñāna mudrā* with left hand.

3. Bend the right hand at elbow & perform *Nāsāgra mudra* i.e. bend the index finger & middle finger, bring the ring finger & little finger near the thumb.

4. Touch the right nostril with the thumb & left nostril with the ring finger & little finger.

5. Close the left nostril & inhale deeply through the right nostril & fill the lungs completely with the air.

6. Perform *mūla bandha* & with hold the breath i.e. *Kuṁbhaka.*

7. Exhale through the left nostril completely, while right nostril is closed then again perform *Kuṁbhaka* with *mūla bandha.*

8. Then inhale deeply through left nostril by closing the right nostril.

9. Perform *Kuṁbhaka* in *mūla bandha.*

10. Exhale deeply through right nostril, while left nostril is closed. This is one cycle.

11. Repeat the cycles for 5 to 10 minutes.

Benefits

1. One feels refreshed as there is excess of oxygen supply.

2. Nerves are calmed & purified.

3. Mind becomes still.

Caution

Persons with hypertension, cardiac ailments should not perform *Kuṁbhaka.*

Types of Prāṇāyāma (Kuṁbhaka)

सूर्यभेदनमुज्जायी सीत्कारी शीतली तथा। भस्त्रिका भ्रामरी मूर्छा प्लाविनीत्यष्टकुम्भकाः।।
(ह.यो.प्र.२/४४)

Prāṇāyāma is of eight types. Namely *Sūryabhedana, Ujjāyi, Sītkarī, Śītalī, Bhastrīkā, Bhrāmarī, Mūrçhā & Plāvinī.*

Sūryabhedana (सूर्यभेदन)

आसने सुखदे योगी बद्ध्वा चैवानकं ततः। दक्षनाड्या समाकृष्य बहिःस्थं पवनं शनैः।।(ह.यो.प्र.२/४८)

Sit in comfortable *āsana*, inhale through the right nostril slowly & exhale through the left.

Sūrya means sun– Here inhalation through the right nostril passes through the *Piṅgalā* or *surya nāḍī* & has heating effect on the body. It enhances the *Agni.*

Method

1. Sit in any comfortable posture, like *Padmāsana* or *Siddhāsana* or *Vajrāsana or sukhāsana.*

2. Keep the back erect & rigid, lower the head & rest the chin in the notch between the collar bones i.e. (*Jālandhara bandha*).

3. Bend the right arm at elbow joint, bend the index & middle finger. Bring the ring finger & little finger near the thumb i.e. Nāsāgra mudrā.

4. Place the right thumb over right nostril & ring & little finger over the left nostril.

5. Close both the right & left nostril simultaneously & with hold the breath in *mūla bandha.*

6. Inhale through the right nostril deeply, closing the left nostril. Then exhale deeply through the left nostril, closing the right nostril with the thumb.

7. Repeat the process of *Kuṁbhaka* after inhalation also.

8. The cycle is repeated for required number of times.

Benefits

कपालशोधनं वातदोत्रं कृमिदोषहृत् । पुनः पुनरिदं कार्यं सूर्यभेदनमुत्तमम् ।। (ह.यो.प्र. २/५०)

Superior *sūrya bhedana* does the purification of vitiation of *Kāpāla* (sinuses), alleviation of *vāta* & destruction of *Kṛmi.*

1. *Prāṇāyāma* aerates the lungs, removes phlegm, enhances lung compliance.

2. It soothen the nerves & tones up the whole body system.

3. It enhances the digestive power & generates heating effect in the body.

4. It cleans the sinuses.

Ujjāyī Prāṇāyāma (उज्जायी प्राणायाम)

'Ut' means superior, *Jaya* means victory. Ujjayi is the process in which the lungs are fully expanded & chest puffed out like that of proud conqueror.

मुखं संयम्य नाडीभ्यामाकृष्य पवनं शनैः । यथा लगति कंठात्तु हृदयावधि सस्वनम् ।।
पूर्ववत्कुंभयेत्प्राणं रेचयेदिडया ततः । श्लेष्मदोषहरं कण्ठे देहानलविवर्धनम् ।।
नाडीजलोदराधातुगतदोषविनाशनम् । गच्छता तिष्ठता कार्यमुज्जाय्याख्यं तु कंभकम् ।।
(ह.यो.प्र.२/५१-५३)

Close the mouth & exhale deeply through both the nostrils, pull it internally by making sound with the epiglottis. Then perform *Kuṁbhaka* as mentioned earlier, then exhale slowly through the left nostril. It pacifies *Kapha*, enhances *Agni*, beneficial in *Jalodara* (Ascites) & diseases of *dhātu.* This *Prāṇāyāma* can be performed at any time in any posture.

Method

1. Sit in any comfortable posture, with the back erect.
2. Perform *Jālandhara bandha.*
3. Close the eyes & exhale completely.
4. Inhale slowly through both the nostrils. The passage of incoming air is felt on the roof of the palate making round with the epiglottis.
5. Then perform *Kuṁbhaka* by doing *mūla bandha.*
6. Exhale slowly deeply & steadily through left nostril.
7. Repeat the cycles for 5 to 10 minutes.

Benefits

1. Improves the lung capacity.
2. Removes the *Kapha* and soothen the nerves.
3. Best for high blood pressure & coronary troubles.
4. Beneficial in *Āmavāta, Kṣaya, Kāsa, Jvara* (fever), *plīha* (splenomegaly), *Julodara* (Ascites).
5. Enhances *Agni* & destroys old age & death.

Sītkarī (सीत्करी प्राणायाम)

सीत्कां कुर्यात्तथा वक्त्रे घ्राणेनैव विजृंभिकाम् । एवमभ्यास योगेन कामदेवो द्वितीयक ।।
योगिनी चक्रसामान्य सृष्टिसंगारकारकः । न क्षुधा न तृषा निद्रा नैवालस्य प्रजायते ।।
भवेत्सत्वं च देहस्य सर्वोपद्रववर्जितः । अनेन विधिना सत्यं योगींद्रो भूमिमण्डले ।।

(ह.यो.प्र.२/५४-५६)

Sītkarī is also done similar to *Ujjāyi* & exhale through nostril. The proper practice of *Sītkarī Prāṇāyāma,* makes one beautiful like *Kāmadeva.* Practice destroys appetite, thirst, sleep & laziness. It enhances body strength & destroys all complications. The practitioner becomes like *Indra.*

Method

1. Sit in *Padmāsana, Siddhāsana* or *Vīrāsana.*
2. Keep the back straight.
3. The lips are slightly parted & put the tip of the tongue between the teeth, tongue is kept flat.
4. Draw fresh air in with sound & completely fill the lungs.
5. Perform *Kuṁbhaka* in *Jālandhara bandha.*

6. Exhale slowly through nose.

7. Repeat the cycle for 5 to 10 minutes.

Benefits

1. Cools the system, soothens the eyes & ears.

2. Beneficial in fever & bitter taste in mouth.

3. It stimulates the liver & spleen, improves digestion & cures thirst.

Śītalī Prāṇāyāma (शीतली)

जिह्वया वायुमाकृष्य पूर्ववत्कुम्भकसाधनम् । शनैकघ्राणरंध्राभ्यां रेचयेत्पवनं सुधीः ।।
गुल्मप्लीहादिकान् रोगान् ज्वरं पित्तं क्षुधा तृषाम् । विषाणि शीतली नाम कुम्भकोयं निहन्ति हि ।। (ह.यो.प्र. २/५७-५८)

Inhalation should be done through the tongue & exhalation through the nostrils. This is *Śītalī Prāṇāyāma* which destroys *gulma* (abdominal tumour), splenomegaly (*plīha*) fever, appetite, thirst, poison & aggravated *pitta*.

Method

1. Sit in *Padmāsana, Siddhāsana or vīrāsana* with the back erect.

2. Open the mouth & form lips into 'O' shape.

3. Sides & tip of the tongue should touch the teeth & roll the tongue & draw the air in through the rolled tongue with sound till lung is completely filled with air.

4. After full inhalation perform *jālandhara bandha*.

5. With hold the respiration (*Kuṁbhaka*) with *mūla bandha*.

6. Slowly exhale through nose with an aspirate sound as in *Ujjāyī*

7. Repeat the cycle for 5 to 10 minutes.

Benefits

1. It cools down the system, soothens eyes & ears.

2. Beneficial in low fever, activates liver, spleen, improves digestion & relieves thirst.

Bhastrika Prāṇāyāma (भस्त्रिक प्राणायाम)

मुखं संयम्य यत्नेन प्राणं घ्राणेन रेचयेत् । यथा लगति हृत्कंठे कपालावधि सस्वनम् ।
वेगेन पूरयेच्चापिहृत्पद्मावधि मारुतम् । पुनर्विरेचयेत्तद्वत् पूरयेच्च पुनः पुनः ।।
यथैव लोहकारेण भस्त्रा वेगेन चाल्यते ।। (ह.यो.प्र. २/५९-६२)

Exhale through the single nostril with the mouth closed, with a sound inhale deeply till it reaches heart, throat & *kapāla*. Then exhale again & again like the black smith's bellow.

Methods

1. Sit in *Padmāsana, Siddhāsana*, or *Vajrāsana*.

2. Take a fast, vigorous breath, exhale fast & forcefully. The sound made resembles air rushing through bellows.

3. At a stretch 10 to 12 cycles should be completed. Then inhale slowly & deeply. Retain the breath in *mūla bandha*, then slowly exhale.

4. Then again repeat fresh cycles of *Bhastrikā*.

Benefits

It stimulates the spleen, liver, pancreas & abdominal organs.

Precaution

1. Persons with weak constitution or poor lung capacity should not practice this.

2. Persons with eye & ear complaints.

3. Persons with high or low blood pressure.

4. In the conditions of bleeding through nose or ears.

Bhrāmarī Prāṇāyāma (भ्रामरी कुम्भक)

वेगाद्घोषं पूरकं भृङ्गनादं भृङ्गीनादं रेचकं मंदमंदम् । योगीन्द्राणामेवमभ्यास योगाच्चित्ते जाता काचिदानंदलीला ।। (ह.यो.प्र. २/६८)

Sound is produced like the large black bea (*bhramara*) during *Prāṇāyāma*. The practitioner gets the feeling of pleasentness.

Method

1. Sit in *padmāsana, Siddhāsana, Vajrāsana* or *Sukhāsana* with the back erect.

2. Perform *jālandhara bandha*.

3. Close the eyes & look inwards.

4. Exhale completely.

5. Take slow, deep, steady breath through both nostrils. Fill the lungs completely.

6. With hold the breath with *mūla bandha*.

7. Exhale slowly with humming round like a black bee.

8. Repeat the cycle five to ten minutes.

Benefits

1. Beneficial in insomania.

2. Relieves stress, tensions, anger, anxiety, & blood pressure

3. Improves the voice & throat ailments.

Mūrcha Prāṇāyāma (मूर्छा प्राणायाम)

पूरकान्ते गाढतरं बद्ध्वा जालन्धरं शनैः। रेचयेन्मूर्छनाख्येयं मनोमूर्छा सुखप्रदा।।(ह.यो.प्र.२/६९)

After deep inhalation, one should perform *Jālandhara bandha* & withhold the breath. Then slowly exhale due to which persons feels like unconscious. This gives happiness in *Mūrçhā Prāṇāyāma.*

Method

1. Sit in *Padmāsana, Siddhāsana, Vajrāsana* or *Sukhāsana* with the spine erect.

2. Inhale slowly through the nostril.

3. Retain the breath in *mūla bandha.*

4. Exhale slowly.

5. Repeat the process for 5 to 10 minutes.

Benefits

1. Excellent preparation for meditation helps to draw the mind in.

2. Alleviates anxiety, tension, anger, neurosis and raises the level of *prāṇa.*

Plāvanī prāṇāyāma (प्लावनी प्राणायाम)

अन्तः प्रवर्तितोदारमारुतापूरितोदरः । पयस्यगाधेऽपि सुखात्प्लवते पद्मपत्रवत्।।(ह.यो.प्र.२/७०)

The air inhaled fills in stomach & practitioner can float over the water like the leaves of the lotus easily.

Benefits

Enhances the capacity to swim.

Mūrçhā & *Plāvaṇī* types of *Prānāyāma* are difficult to perform by a common person. Few *yogis* can practice it.

Chapter- 4
ṢAṬKARMA

The body is like unbaked earthern vessel, gets destroyed when thrown into water. The fire of practice of yoga bakes it & makes it strong & pure.

There are seven means for training the body.

शोधनं दृढता चैव स्थैर्यं धैर्यञ्च लाघवम्। प्रत्यक्षञ्च निर्लिप्तञ्च घटस्य सप्तसाधनम्।।(घे.सं.१/९)

Purification, strengthening, steadying, calming, lightness, perception & isolation are seven different measures for training of body.

षट्कर्मणां शोधनं च।

Regular practice of *Ṣaṭkarma* leads to purification of the body.

मेदः श्लेष्माधिकः पूर्वं षट्कर्माणि समाचरेत्। अन्यस्तु नाचरेत्तानि दोषाणां समभावतः।।
(ह.यो.प्र.२/२१)

Person having excess of *Śleṣma* & *medas* (fat), should practice *Ṣaṭkarma*, otherwise it is not necessary as *doṣas* are in equilibrium.

धौतिर्बस्तिस्तथा नेतिस्त्राटकं नौलिकं तथा। कपालभातिश्चैतानि षट् कर्माणि प्रचक्षते ।।
(ह.यो.प्र.२/२२)

Dhauti, Basti, neti, Trāṭaka, Nauli, & Kapālabhāti are six purification measures mentioned in *yoga*.

Classification of ṣaṭkarma

Ṣaṭkarma

- *Dhauti*
  - *Antardhauti*: *Vāta sāra*, *Vāri sāra*, *Vanhi sāra*, *Bahiṣkṛta*
  - *Danta dhauti*: *Danta mūla*, *Jihva mūla*, *Karṇarandhra*, *Kapāla randhra*
  - *Hṛddhauti*: *Daṇḍa dhauti*, *Vamanadhauti*, *Vastra dhauti*
  - *Mūlaśodhana*
- *Basti*: *Jala basti*, *Sthala basti (Śuṣka basti)*
- *Neti*: *Jalaneti*, *Sūtraneti*, *Madhuneti*
- *Nauli*: *Vāma*, *Madhyama*, *Dakṣina*
- *Trāṭaka*
  - *Antaraṅga*
  - *Bahiraṅga*: *Samīpa*, *Dūratrāṭaka*
- *Kapālabhāti*: *Vyutkrama*, *Śitkrama*, *Vāmakrama*

Dhauti

अन्तर्धौतिदन्तधौतिर्हृद्धौतिमूलशोधनम्। धौतिं चतुर्विधां कृत्वा घटं कुर्वन्तु निर्मलम्।।(घे.सं.१/१३)

The *Dhautis* of four kinds help in clearing the impurities of the body. They are *Antardhauti, Danta dhauti, Hṛddhauti & mūla śodhana.*

Antardhauti

Antardhauti is again subdivided into four types. They are– *Vātasāra, Vārisāra, Vanhisāra & Bahiṣkṛta.*

Vātasāra dhauti

Method

काकचुञ्चुवदास्येन पिबेद्वायुं शनैः शनैः । चालयेदुदरं पश्चात् वर्त्मना रेचयेच्छनैः।।(घे.सं.१/१५)

The mouth is contracted & made like the beak of the crow & slowly air should be drunk. The stomach is slowly filled with air, this should be moved slowly and excreted through the lower passage.

Benefits

वातसारं परं गोप्यं देहनिर्मलकारणम् । सर्वरोगक्षयकरं देहानलविवर्धकम् ।। (घे.सं. १/१६)

The *Vātasāra* is a secrete process, which cleans the body, destroys all diseases & enhances the *agni.*

Vārisāra dhauti

Method

आकण्ठं पूरयेद्वारि वक्त्रेण च पिबेच्छनैः । चालयेदुदरेणैव चोदराद्रेचयेदधः ।। (घे.सं. १/१७)

Water is filled in the mouth upto throat & this is drank slowly. This moves to the stomach & should be expelled through rectum.

Benefits

वारिसारं परं गोप्य देहनिर्मलकारकम् । साधयेत्तत्प्रयत्नेन देवदेहं प्रपद्यते ।। (घे.सं. २/१८)

Secrete process of *Vārisāra* cleans the body. By practicing it carefully, one gets shining body.

Agnisāra

Method

नाभिग्रन्थिं मेरुपृष्ठे शतवारं च कारयेत्। अग्निसारमेषां धौतिर्योगिनां योगसिद्धिदा।।(घे.सं.१/१९)

Press the naval region or intestines towards the spine for hundred times. This *agnisāra* process gives success in the practice of *yoga.*

Benefits

उदरामयजं त्यक्त्वा जाठराग्नि विवर्धयेत् । (घे.सं. १/२०)

It cures all the diseases of abdomen & enhances the *agni.*

Bahiṣkṛta dhouti

Method

काकीमुद्रां साधयित्वा पूरयेदुदरं मरुत् । धारयेदर्द्धयामन्तु चालयेदर्धवर्त्मना ।। (घे.सं.१/२२)

Make the mouth like crow's beak, fill the stomach with air. Retain this for one and half hour & then force it down towards the intestine. Then stand in the naval deep water, draw out *Śaktināḍī* i.e. intestines, wash it with hand & draw it inside again. This is not possible till one can with hold his breath for one hour.

Note– This type of *dhauti* can not be practiced by common people.

Danta Dhauti

Danta dhauti is of five types. *Danta mūla, Jihvā mūla, Karṇa randhra* (2) & *Kapāla randhra.*

Dantamūla dhauti

Method

खदिरेण रसेनाथ मृत्तिकया च शुद्धया । मार्जयेद्दन्तमूलञ्च यावत्किल्विषमाहरेत् ।।(घे.सं.१/२७)

One should rub the teeth with Catechu powder or pure earth till the dental impurities are removed.

Benefits

Preserve the teeth longer.

Jihvā śodhana

तर्जनीमध्यमानामा अङ्गुलीत्रययोगतः । वेशयेद्गलमध्ये तु मार्जयेल्लम्बिकामूलम् ।।
शनैः शनैर्मार्जयित्वा कफदोषं निवारयेत् ।। (घे.सं. १/३०)

Index finger, middle finger & ring finger are joined together & used to clean the root of the tongue. Tongue should be rubbed till *Kapha* is removed. Tongue is washed & rubbed with butter, pulled out little with metal instrument every day, so that tongue gets elongated gradually.

Karṇa dhauti

तर्जन्यनामिकायोगान्मार्जयेत् कर्णरंध्रयोः।नित्यमभ्यास योगेन नादऽन्तरं प्रकाशयेत्।।(घे.सं.१/३३)

Clean the ear every day with the help of index & ring finger. By practicing this one can hear mystic sounds.

Kapāla randhra dhauti

वृद्धाङ्गुष्ठेन दक्षेण मार्जयेद्भालरन्ध्रकम् । एवमभ्यास योगेन कफदोषं निवारयेत्।। (घे.सं.१/३९)

Depression in the forehead near the nasal bridge is pressed with thumb of right hand. By the practice of this *Kapha doṣa* gets subsided.

If one practices daily after getting up from sleep, after meals & in the evening, he will be endowed with extra ordinary vision.

Hṛddhauti

Hṛddhauti is of three types. Namely *Daṇḍa dhauti, Vamana* & *Vastra dhauti.*

Daṇḍa dhauti

Method

रम्भादण्डं हरिद्‌दण्डं वेत्रदण्डं तथैव च । हृन्मध्ये चालयित्वा तु पुनः प्रत्याहरेच्छनैः।।(घे.सं.१/३७)

Take the stalk of banana, turmeric or cane, put it into the oesophagus slowly & with draw it out slowly.

Benefits

कफपित्तं तथा क्लेदं रेचयेदूर्ध्ववर्त्मना। दण्डधौतिविधानेन हृद्रोगं नाशयेत् ध्रुवम्।।(घे.सं.१/३८)

By this process, *Kapha, pitta & kleda* are expelled out & cures all kinds of heart diseases surely.

Vamana dhauti

Method

भोजनान्ते पिबेद्वारि चाकण्ठपूरितं सुधीः। ऊर्ध्वं दृष्टिं क्षणं कृत्वा तज्जलं वमयेत्पुनः।। (घे.स.२/३९)

After meals one should drink water upto the throat, then look upwards for a while & vomit it out.

Benefits

नित्यमभ्यास योगेन कफपित्तं निवारयेत् ।। (घे.सं. १/३९)

Practice of this every day cures diseases of *pitta & kapha.*

Vastra dhauti

Method

चतुरङ्गुल विस्तारं सूक्ष्मवस्त्रं शनैर्ग्रसेत्। पुनः प्रत्याहरेदेतत्प्रोच्यते धौति कर्म्मकम्।।(घे.सं.१/४०)

Thin cloth of four finger width is slowly swallowed & drawn out slowly afterwards. This process in *Vastra dhauti.*

Benefits

गुल्म ज्वर प्लीह कुष्ठ कफपित्तं विनश्यति। आरोग्यं बल पुष्टिं च भवेत्तस्य दिने दिने।।(घे.सं.१/४१)

It cures abdominal diseases (*Gulma*), fever, splenomegaly, skin diseases, diseases of *Kapha* & *pitta*. If practiced regularly he will be endowed with health, strength & nourishments.

Mūla śodhana

Method

पित्तमूलस्य दण्डेन मध्यमाङ्गुलिनापि वा। यत्नेन क्षालयेत् गुह्य वारिणा च पुनः पुनः।।(घे.सं.१/४३)

By the stalk of turmeric or middle finger, the rectum should be cleaned well with water again & again.

Benefits

वारयेत्कोष्ठकाठिण्यं अजीर्णं निवारयेत्। कारणं कान्तिपुष्ट्योश्च वन्हिमण्डल दीपनम्।।(घे.सं.१/४४)

Destroys constipation and indigestion, enhances lusture and nourishment and *agni*.

Basti

जलबस्तिः शुष्कबस्तिर्बस्तिः स्यात् द्विविधा स्मृता ।। (घे.सं. १/४५)

Basti is of two types, one is *Jala basti* & the other *sthala basti* or *śuṣka basti*.

Jala basti

Method

नाभिमग्नजले पायुं न्यस्तवानुत्कटासनम्। आकुञ्चन प्रसारञ्च जलबस्तिं समाचरेत्।।(घे.सं.१/४६)

One should stand in the naval level water, assume *Utkaṭāsana* position, contrast & relax the muscles of anal sphincter. This is *Jala basti*.

Benefits

प्रमेहश्च उदावर्तं क्रूरवायुं निवारयेत् । भवेत्स्वच्छन्ददेहश्च कामदेव समो भवेत् ।। (घे.सं.१/४७)

It cures urinary disorders (*Prameha*), *udāvarta* (disorders of *vāyu*) & constipation. Body becomes beautiful like that of *Kāmadeva*.

Sthala basti

Method

बस्तिं पश्चिमोत्थानेन चालयित्वा शनैरधः। अश्विनी मुद्रया पायुमाकञ्चयेत् प्रसारयेत्।।(घे.सं.१/४८)

One should assume the posture of *Paścimottānāsana*, then perform *Aśvini mudra* by contracting & relaxing anal sphincture.

Benefits

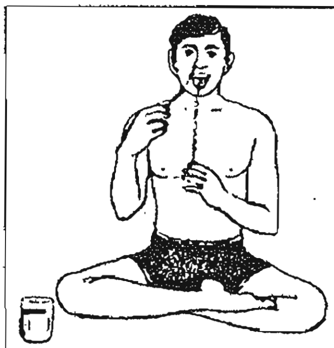
एवमभ्यासयोगेन कोष्ठदोषो न विद्यते। विवर्धयेत् जाठराग्निमामवातं विनाशयेत् ।।(घे.सं.१/४९)

Practice of this cures constipation, enhances *agni* & cures *āmavāta*.

Neti

Method

वितस्तिमानं सूक्ष्मसूत्रं नासानाले प्रवेशयेत्। मुखान्निर्गमयेत्पश्चात् प्रोच्यते नेतिकर्मकम्।।(घे.सं.१/५०)


Sūtra Neti

Take a thin thread of 32 *aṅgulas*, insert it through one nostril & take out through mouth, this is *neti karma*.

Benefits

साधनान्नेतिकार्यस्य खेचरीसिद्धिमाप्नुयात्। कफदोषा विनश्यन्ति दिव्यदृष्टिः प्रजायते।। (घे.सं. १/५१)

By practicing *neti krīyā*, one can obtain *khecari mudra*. It destroys *Kaphadoṣa* & gives clear vision.

Even though the classics of *Gheraṇda saṁhita* & *Haṭha yoga Pradīpika* donot describe other types of neti, *Jala neti* & *Madhu neti* are also in practice.

Jalaneti

Method

Pinch of salt is mixed in luke warm water. It is taken in a *neti* pot with nozzle. The nozzle is introduced into one nostril, tilting the head to the opposite side one should empty the water into the nostril. Automatically water comes out through the other nostril.

Precaution

One should breath through mouth, not through the nose during this period.

After practicing *neti*, one should do *Kapāla bhāti* for 25-50 times to take out any remaining *Kapha* or water.

Benefits

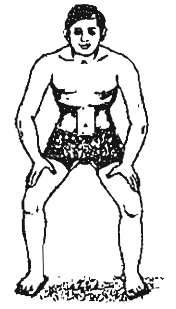
- Beneficial for eyes,
- Helpful in *Kapha* disorders

Similarly *madhu neti* is practiced by adding 3-4 drops of honey *in place of salt*.

Nauli/Laukiki

Method

अमंदावर्तवेगेन तुंदं सव्यापसव्यत: । नतांसो भ्रमयेदेषा नौलि: सिद्धै: प्रचक्षते । (ह.यो.प्र.२/३३)


Nauli

One should move the stomach & intestines from one side to other side. This process is called as *nauli* or *laukiki*.

Benefits

सर्वरोगान्निहन्तीह देहानलविवर्द्धनम् ।। (घे.सं.१/५२)

Cures all variety of diseases & increases bodily fire.

अशेषदोषामय शोषणी ।। (ह.यो.प्र.२/३४)

It dries of all the *doṣas* completely.

Note– The recent *yoga* practitioners classify it into *vāma* (left), *Dakṣina* (right) & *Madhya* (central) *nauli* depending on the region.

Trāṭaka

Method

निमेषोन्मेषकं त्यक्त्वा सूक्ष्मलक्ष्यं निरीक्षयेत्। यावदश्रु न पतति त्राटकं प्रोच्यते बुधै: ।।(घे.सं.१/५३)

One should continuously look at some small object till eyes tear. This is called as *Trāṭaka.*

Benefits

एवमभ्यासयोगेन शाम्भवी जायते ध्रुवम्। नेत्ररोगा विनश्यन्ति दिव्यदृष्टि: प्रजायते।।(घे.सं.१/५४)

By practicing this technique, one can attain *Śāṁbhavī siddhi* very fast. It destroys all eye diseases & gives good vision.

Some authers classify it into

Antaraṅga & Bahiraṅga trāṭaka. Bahiraṅga trāṭaka is further divided into distant & near *Trāṭaka* depending on the distance of the object one concentrates on.

In distant *Trāṭaka* one gazes sun, moon, stars etc. In near Trāṭaka one gazes at the objects like idol, candle, light, nose tip, red cloth, bindu (point), line (*rekha*), reflection, fire etc.

Kapālabhāti

वामक्रमेणव्युत्क्रमेण शीत्क्रमेण विशेषत:। भालभर्ति त्रिधा कुर्यात्कफदोषं निवारयेत्।।(घे.सं.१/५५)

Kapālabhāti is of three types, namely *Vāma krama, Vyutkrama* & *śītkrama.* They destroy *Kapha doṣa.*

भस्त्रवल्लोहकारस्य रेचपूरौ ससभ्रमो।कपालभातिर्विख्याता कफदोष विशोषणः।।(ह.प्र.२/३५)

As the black smith blows his bellow in the same way one should inhale & exhale very fast. This is *Kapālabhati* & it dries of *Kapha doṣa*.

Vāma krama

Method

इडया पूरयेद्वायुं रेचयेत् पिङ्गला पुनः । पिङ्गल्या पूरयित्वा पुनश्चन्द्रेण रेचयेत् ।। (घे.सं. १/५६)

Inhale through the left nostril & exhale through right nostril, then inhale through right nostril & exhale through left nostril.

Benefits– The inspiration & expiration should be without force which destroys *Kapha*.

Vyutkrama

Method

नासाभ्यां जलमाकृष्य पुनर्वक्त्रेण रेचयेत्।पायं पायं व्युत्क्रमेण श्लेष्म दोषं निवारयेत्।।(घे.सं.१/५८)

Draw water through both the nostrils & expel through mouth slowly. This process is *Vyutkrama kapālabhāti* which destroys *Kapha* disorders.

Śītkrama

शीत्कृत्य पीत्वा वक्त्रेण नासानालैर्विरेचयेत् । एवमभ्यासयोगेन कामदेवसमो भवेत्।।(घे.सं.१/५९)

Drink water through mouth & expel it through nostrils to get a beautiful body like that of *Kāma deva*.

Benefits

न जायते वार्धक्यं च जरा नैव प्रजायते। भवेत् स्वच्छन्द देहश्च कफदोषं निवारयेत्।।(घे.सं.१/६०)

This prevents old age & diseases. The body becomes healthy elastic & free from *Kapha* disorders.

Prātyāhāra (प्रत्याहार)

Prātyāhāra is the act of self control & is the bridge between *Antaraṅga and bahiraṅga yoga*.

In other wards it is a step to attain ultimate goal, the salvation.

स्वविषयासंप्रयोगे चित्तस्वरूपानुकार इवेन्द्रियाणां प्रत्याहारः ।। (प.यो.सू. २/५४)

As the sense organs are not in contact with objects, they mimic features of mind. The sense organs become introvert.

शब्दादि विषयान् पञ्च मनश्चैवाति चञ्चलम् । चिन्तयेदात्मनो रश्मीन् प्रत्याहारः स उच्यते ।।

(अमृतनादोपनिषत् ५/)

Mind wavers due to union with sense objects like sound etc. Thinking about 'self' is called as *Pratyāhāra*.

ततः परम वश्यतेन्द्रियाणाम् ।। (प.यो.सू. २/५५)

By the practice of *Pratyāhāra* the sense organs are under the complete control of mind. Here the control over the mind has been achieved. The person starts to look internally, about 'self'. This is the initial stage of thinking about 'self'.

Dhāraṇā (धारणा)

देशबन्धश्चित्तस्य धारणा ।। (यो.द. ३/१)

Process of withdrawal of mind from the senses & its blending with the soul is *Dhāraṇā*.

मनः संकल्पकं ध्यात्वा संक्षिप्यात्मनि बुद्धिमान् धारयित्वा तथात्मानं धारणं परिकीर्तिता ।।
(अमृतनादोपनिषत् ५)

After remembering the goal, concentrating over it & blending with soul is *dhāraṇā*.

After gaining control over the body through practice of *Āsanās*, controlling movement of prāṇa by process of *Prāṇāyāma*, withdrawing of sense objects from sense organs by *Prātyāhāra*, the practitioner reaches to *Dhāraṇā*, one among the *antaraṅga yoga*.

Here the mind is in *ekāgra* state, with concentration on desired object, which is most essential to attain *ātma jñāna*. In *dhāraṇā*, after withdrawal of sense organs from sense objects, person concentrates on specific region like umbilicus, heart, tip of nose, centre of eyebrows, *brahmarandhra, ātma*, moon or star. Then binds his mind with that particular aim. This concentration is known as *dhāraṇā*.

●

Chapter- 5

MEDITATION

तत्र प्रत्ययैकतानता ध्यानं ।। (प.यो.सू. ३/२)

Deep concentration in a particular thought or region like heart the seat for *Cakrās* in which, mind is in state of complete concentration *ekāgra* is called as *dhyāna* (meditation). Here there is continuous thought about same object & there is no deviation even for a fraction.

It is of 2 types–

1. *Saguṇa dhyāna* 2. *Nirguṇa dhyāna*

Saguṇa dhyana (सगुण ध्यान)

सगुणं मूर्ति ध्यानं ।। (शाण्डील्योपनिवत्)

Meditation by concentrating over idol or symbol is *saguṇa. dhyāna*.

समभ्यसेत्तथा ध्यानं घटिकाषष्ठिमेव च । वायुं निरुद्ध चाकाशे देवतामिष्टदामिति ।।
सगुणध्यानमेतत्स्यात् अणिमादिगुणप्रदम् ।। (योगतत्वोपनिषत् १०४)

Controlling breathing & concentrating over desired god in the mind for sixty *ghaṭika*. This will endow the practitioner with *aṣṭaiśvarya* like *aṇimā, mahimā* etc. It is known as *saguṇa dhyāna*.

Nirguṇa dhyana (निर्गुण ध्यान)

निर्गुणमात्मयथात्म्यम् ।। (शाण्डील्योपनिषत्)

Meditation by concentrating over soul (*ātma*) is *Nirguṇa dhyāna*.

निर्गुणध्यानयुक्तस्य समाधिश्च तथो भवेत् । दिनद्वादशकैनैव समाधि समवाप्नुयात् ।।
वायुं निरुध्य मेधावी जीवन्मुक्तो भवत्ययं । समाधिः समतावस्था जीवत्मपरमात्मनो ।।
(योगतत्वोपनिषत् १०५-१०६)

The person practicing *Nirguṇa dhyāna* can attain *samādhi* with in twelve days only. Once the person has achieved control over *vāyu*, he will be free from *Jīvana* & attain *samādhi* a condition of union between *jīvātma* & *paramātma*.

As the water takes the shape of its container, the mind when it contemplates an object of thought, blends, so well with the mind

that, there is no interruption in the flow of thought even for moment.

Effects of Meditation on the body & mind

Oxygen consumption level drops to 16-18% with in first few minutes of meditation. After meditation it comes to normal level. Comparing oxygen consumption level between sleep and hypnosis, it can be concluded that, meditation produces a state of rest, deeper than sleep and distinctly different from subjectively reported relaxation during hypnosis. The reduction in the consumption of oxygen and excretion of CO_2 is due to reduced metabolic activity. Oxygen consumption was reduced in terms of both the volume of air breathed and also the rate of breathing.

Airway conductance is the inverse of resistance to air flow in passage way of lungs. 19.5% increase in conductance is recorded during meditation, so helpful in Asthma and pulmonary disease. In Normal condition this is not possible.

Average decrease of 25% of cardiac out put simultaneously leads to fall of heart rate by about 5 beats/min. It is a state of deep metabolic rest. Increase in galvanic skin responce is incompletely understood and accurate measure of relaxation.

Physiology of Meditation

1. Certain *yogis* can control activity of their ANS.

2. Meditation is a unique state of deep rest, particularity for ANS (Autonomic Nervous System).

3. Meditation lowers metabolic rate, some experts decreased the consumption of oxygen and elimination of CO_2 by about 20%.

4. Brain wave patterns not seen in other states of consciousness are found.

Alpha wave activity in their normal resting period and marked increase in amplitude of alpha wave, during meditation some times those wave number will be reduced down to unusual manner to become rythmical theta wave trains, later slow in frequency.

EEG changes

(i) Appearance of alpha wave-

(ii) Increase in alpha amplitude 8-9 cps

(iii) Decrease in alpha frequency

(iv) Appearance of rythmical theta wave train 5 to 7 cps

Significant decrease in concentration of arterial lactate (the apparently stress related blood chemical), the decrease is nearly about 4 times.

Mentally becomes more and more alert, yet settles into wakeful state with pure enjoyment. Cellular activity all over body slows down, improves persons adaptability and resistance to stress. Acts on ANS by naturally reducing sympathetic hyper arausal. It counteracts the weakening effect of stress upon body, by activating the energy restoring parasympathetic nervous system.

It is a fourth state of consciousness, profound rest coupled with heightened alertness and regenerative value for the body.

Samādhi (समाधि)

समाधीयते चित्तमनेन इति समाधि । तदेवार्थमात्रनिर्भासं स्वरूपशून्यमिव समाधिः ।(यो.द.३/३)
समं मन्यते यं लब्ध्वा स समाधिः ।। (अ.ना. १६/)

Deep state of meditation where in yogi forgets about everything including himself, unaware of surroundings. In meditation subject of *dhyāna* and act of *dhyāna* are separate. In *samādhi* act is one with object (*dhyāna*) it self.

त्रयमेकत्रसंयमः ।। (यो.द. ३/४)

Dhāraṇa, dhyāna & *samādhi* together are called *Saṁyama*.

Types of Samādhi

< सम्प्रज्ञात समाधि या सबीजसमाधि
असंप्रज्ञात समाधि या निर्बीज समाधि

Saṁprajñāta samādhi (सम्प्रज्ञात समाधि)

वितर्क विचारानन्दास्मितारूपानुगमात् सम्प्रज्ञातः ।। (यो.द. १/१७)
ता एव सबीजसमाधि ।। (यो.द. १/१६)

When *yogi* attains *Samādhi*, subsequently he gets *'ātma sākṣātkāra'* knowledge about self, where all *cittavṛtti* are lost & mind is *ekāgra*. It has 4 stages.

1. Vitarkānugata– Concentration over physical gross item like idol of god etc.

2. Vicārānugata– After good thought about gross material, one starts to concentrate on subtle aspects like *tanmātra*.

3. Ānandānugata– Here he concentrates on subtler aspect in his mind.

4. Asmitānugata– The subject of thought is only *Asmita* or *Ahaṅkāra*.

Asaṁprajñāta Samādhi (असंप्रज्ञात समाधि)

विरामप्रत्ययाभ्यास पूर्व संस्कार शेषोऽन्यः ।। (यो.द. १/१८)

निरोधे सर्व निरोधान्निर्बीजः समाधिः ।। (यो.द. १/५)

Condition where all *cittavṛttis* are completely blocked, no desire for any worldly pleasures exist, only *Saṃskārā* remain in the mind. Mind is completely *ekāgra* is *Asaṃprajñāta samādhi*. This it self is *Nirbīja samādhi*.

Effects of Samādhi (समाधिफल)

पाशान् छित्वा यथा हंसो निर्विशङ्क खमुत्पतेत् । छिन्नपाशस्तथा जीवः संसार तरते सदा ।।
यथा निर्वाण काले तु दीपो दग्ध्वा लयं व्रजेत् ।। तथा सर्वाणि कर्माणि योगी दग्ध्वा लयं व्रजेत् ।।
(अमृतनादोपनिवत्)

As the *haṃsa* flies in the sky by breaking the bonds, without any doubt the *jīva* breaks away the bonds from the body & becomes one with the universe, as the wick in the lamp gets burnt at the end of burning, in the same way all the previous deeds of *yogi* gets destroyed at the time of liberation (*nirvāṇa*).

Yoga for certain diseases

Hyperacidity

Ardha candrāsana, Pādahastāsana, Nāvāsana, Jānuśīrṣāsana, Pascimottānāsana, Ardhmatsyendrāsana śalabhāsana, Dhanurāsana, Bhujāṅgāsana, Mayūrāsana, Pavanamuktāsana, Śavāsana, Prāṇāyāma.

Arthritis of the lower back

Parivṛttatrikoṇāsana, Vīrabhadrāsana, Ardha candrāsana, Pādānguṣṭhāsana, pādahastāsana, Sarvāṅgāsana, Uṣṭrāsana.

Arthritis of dorsal region

Padmāsana, Vīrāsana, Gomukhāsana, Paścimottāsana Bhujaṅgāsana, Vṛkṣāsana, Sarvāṅgāsana, Ardhamatsyendrāsana, Uṣṭrāsana, Dhanurāsana.

Shoulders

Pārśvakoṇāsana, Ardhacandrāsana, Halāsana, Dhanurāsana, Ūdrdhva & Adhomukha śvānāsana, Vīrāsana, Paścimottānasana, Gomukhāsana, Maricyāsana, Uṣṭrāsana.

Asthma

Sarvāṅgāsana, Uttanāsana, Paścimotthānāsana, Bhujaṅg-āsana, Śalabhāsana, Dhanurāsana, Vīrāsana, supta vīrasana, uṣṭrāsana,

Back ache

Sarvāṅgāsana, Pascimottānāsana, Ardhamatsyendrāsana, Uṣṭrāsana, Śalabhāsana, Dhanurāsana.

High Blood Pressure

Halāsana, Paścimottānāsana, Vīrāsana, Siddhāsana, Padmāsana, Śavāsana, Prāṇāyāma without Kumbhaka.

Low blood pressure

Halāsana, Siddhāsana, Vīrāsana, Paścimottānāsana, Padmāsana, Nāḍī śodhana, prāṇāyāma.

Colitis

Sarvāṅgāsana, Paścimottāsana, Vīrāsana, Supta vajrāsana, Jaṭhara parivartanāsana, Nāvāsana, Januśīrṣāsana, Śalabhāsana, Dhanurāsana,

Constipation

Śīrṣāsana, sarvāṅgāsana, Paścimottāsana, Pavanamuktāsana.

●

Chapter- 6

IḌĀ, PIṄGALĀ & SUṢUMNĀ NĀḌĪS

Iḍā, Piṅgalā & Suṣumnā are considered as *Trināḍīs* i.e. three important channels, through which the *kuṇḍalinī* the serpent power flows.

Kuṇḍalinī is the devine cosmic energy, which is sleeping in the lowest bodily centre, at the base of the spinal colomn. It is awakened by the proper practice of *yoga*, it goes to the brain through *Suṣumnā nāḍī*, through *Ṣaṭcakrās*.

Iḍā– A *nāḍī*, a channel of energy originating from the left nostril, then moving up to the crown of the head & then traversing down to the base of the spine. It represents the lunar energy, also called as *candra nāḍī*.

Piṅgalā– A *nāḍī*, a channel of energy originating from right nostril, traversing to the centre of the head & then travels down to the base of the spine. It represents the solar energy & called as *Sūryanāḍī*. It is reddish or coppery red in colour.

Suṣumnā– The main channel of energy situated in the spinal colomn, through which *kuṇḍalinī* power moves.

Śūnya padavi, brahmarandhra, mahāpatha, Śāṁbhavi, madhya mārga are the synonyms of *Suṣumnā*.

इडा भगवती गङ्गा पिङ्गला यमुना नदी । इडापिङ्गालयोर्मध्ये बालरण्डा च कुण्डली ।।

Iḍā is like *gaṅgā*, *Piṅgalā* is like *Yamunā* river, which are pure & in between these two, through suṣmnā the *kuṇḍalinī* power travels like *bālaraṇḍā or Sarasvati*. This is the ultimate achievement & the path to attain salvation.

Techniques helpful in Kuṇḍalinī awakening

Padmāsana, Siddhāsana, Pūrṇa matsyendrāsana, Kandāsana, Prāṇāyāma, Pratyāhāra, Dhāraṇā, Dhyāna & Samādhi help in awakening of Kuṇḍalinī.

Ṣaṭcakra

Cakra is closely associated with the specific organ or endocrine gland, these spinning centres of energy are part of subtle en-

ergy system, which are the basis of healing our physical, mental, emotional and spiritual selves in acient India. *'Cakra'* means wheel. These modulate the flow of subtle energy & are traditionally represented as lotus flowers, each vibrating at different frequencies, corresponding to the colour of rainbow.

These are placed with stem of each lotus flower, metaphysically embedded into spinal colomn or *Suṣumnā* from *coccyx* to crown of head.

'Aura' a vibrational form of energy, vibrating at the rate imperceptible by the human eye and brain. Earliest mention of term *cakra* is found in *vedas*.

Cakras operate like interconnected self opening valves, that modulate the flow of life force or prāṇik energy, flowing through the channels. When there is obstruction in one part of system, it has an impact on all other parts of body.

Such thing can happen when energy flowing through *Cakras* is either excess or deficient.

Cakra	**Endocrine gland**	**Colour**
1. Mūlādhāra cakra	Adrenals – Metabolism of fat, protiens, carbohydrates, salt balance emergency hormones.	Red
2. Svādhiṣṭhāna cakra	Sacral plexus – Ovaries/Testis	Orange
3. Maṇipūra cakra	Solar plexus – Pancreas	Yellow
4. Ānāhata cakra	Thymus	Green/Pink
5. Viśuddha cakra	Thyroid/Parathyroid	Blue
6. Ājñā cakra	Pitutary	Indigo
7. Sahasrāra cakra	Pineal	(Violet, gold, white)

Traditional Interpretation– As lotus flower, the petals of each *cakra* open to the front of the body, while the stems open out back. Stems normally remain closed and have negative polarity, where as petals consecutively vibrate rotate in clockwise and anticlockwise direction as well as open and close. They have positive polarity.

U.S. neurophysiologist and psychologist Dr. Valerie & V. Hunt opine that two electrical forms of energy are present in physical body.

1. Alternating current of Nervous system and brain, which control our muscles and becomes physical sensation.

2. Continuous electromagnetic radiation coming off our atoms, which allow for an energy exchange of individuals and their environment.

Each person's energy field is said to surround them like covering, which is measured from the universal energy pool known as "universal life force" the *'prāṇa'*. This pool of energy is brought into the body through the *cakra* and converted by them into particular quality dominent sense and emotional correlate. *Cakra* act as valve.

A smooth steady flow of prāṇik energy through *cakra* system ensures a healthy arua, intern indicating a body clear from disease.

Different ways to balance Cakra

1. Archetypes– By different stories understanding life and way to come out of trouble, 2. Physical exercise, 3. Crystal healing, 4. Meditation.

Chapter- 7

BANDHAS AND MUDRĀS

'Bandha' means bandage or joining together. It is a posture where in certain organs or body parts of body are contracted controlled & bonded together.

Mudrā is also a posture, which helps in union of body organs, through that union of body, mind and *ātma* with *Paramātma* which will lead to attainment of salvation.

तस्मात् सर्व प्रयत्नेन प्रबोधयितुमीश्वरीम्।ब्रह्मद्वारमुखे सुप्तां मुद्राभ्यासं समाचरेत्।।(ह.यो.प्र.३/५)

One should try to awaken *Kuṇḍalinī* the serpant power, which dormantly lies at the base of the spinal colomn through the proper practice of *mudrās*. This not only helps in awakening the *Kuṇḍalinī* power, but also destroys old age & death, so only *Ādināthạ* one among *Siddhas* mentions these *mudrās* for attainment of *Aṣṭa Aiśvarya*, which is devine & is not attained by the mere control of *prāṇa* through *prāṇāyāma*.

Classification according to Haṭhayoga Pradīpika

महामुद्रा महाबन्धो महावेधश्च खेचरी। उड्डियानं मूलबन्धश्च बन्धो जालन्धराभिधः।।
करणी विपरीताख्या वाज्रोली शक्तिचालनम्। इदं हि मुद्रादशकं जरामरण नाशनम्।।(ह.यो.प्र.३/६)

Mudrās & bandhās have been mentioned in *Yoga* for the attainment of eight *Aiśvarya* along with *aṣṭāṅga yoga. Mahāmudra, mahābandha, mahāvedha, khecari, uḍḍiyāna, mūlabandha, Jālandhara bandha, viparīta karaṇī, vajrauli & śakticālana* are ten important *mudrās*.

In *Gheraṇḍa saṁhita* twenty five *mudrās* have been described.

Classification according to Gheraṇḍa saṁhita

Mahā mudrā	*Yoni*	*Pāśinī*
Nabho mudrā	*Vajrolī*	*Kākī*
Uḍḍiyāna	*Śakticalanī*	*Mātaṅgī*
Jālandhara	*Taḍāgī*	*Bhujaṅginī*
Mūla bandha	*Mānḍukī*	
Māhā bandha	*Śāṁbhavī*	
Khecarī	*Pañcadhāraṇa*	
Viparīta karaṇī	*Aśvinī*	

Among these *mudrās,* only important ones are discussed in detail.

Mahābandha (महाबन्ध)

पार्ष्णी वामस्य पादस्य योनि स्थाने नियोजयेत् । वामोरुपरि संस्थाप्य दक्षिणं चरणं तथा ।
पूरयित्वा ततो वायुं हृदये चिबुकं दृढम् । निष्पीड्य वायुमाकुंच्य मनोमध्ये नियोजयेत् ।।
धारयित्वा यथाशक्ति रेचयेदनलं शनैः । सव्याङ्गे तु समभ्यस्य दक्षाङ्गे पुनरभ्यसेत् ।।
(ह.यो.प्र. ३/१९-२१)

Keep the left foot near the genitals & keep the right foot on left thigh. Inhale deeply, keep the chin on the chest bone as in *Jālandhara bandha.* Contract arm & genitals & concentrate in the middle of eyebrows, with hold the breath for some time, then slowly exhale. Similarly practice it with right foot also.

This obstructs the upward movement of *nāḍī,* so helps to attain great *siddhi.*

Mūla bandha (मूलबन्ध)

'Mūla' means root, origin, basis or foundation. *Mūla bandha* starts near the anus & genitals ie. nearest to *mūladhāra cakra.*

पार्ष्णि भागेन संपीड्य योनिमाकुञ्चयेत् गुदम् । अपानमूर्ध्वमाकृष्य मूलबन्धोभिधीयते ।।
अधोगतिमपानं वा ऊर्ध्वगं कुरुते बलात् । आकुंचनेन तं प्राहुर्मूलबन्धं हि योगिनः ।।
(ह.यो.प्र.३/६१-६२)

Press the genitals with the heals. Simultaneosly contract the anus & perineal muscles, move the *apāna vāyu* in the upward direction. This is known as *mūla bandha.* As it drags up the *apāna vāyu* moving in the downward direction, it is known as *mūla bandha.*

Jālandhara bandha (जालन्धर बन्ध)

'Jāla' means net, web, or mesh. In *Jālandhara* the neck & throat are contracted & the chin rests on the chest in the notch between collar bones at the top of the breast bone.

कण्ठमाकुञ्च्य हृदये स्थापयेच्चिबुकं दृढम् । बन्धो जालन्धराख्येऽयं जरामृत्युविनाशकः ।।
बध्नाति हि शिराजालमधोगामी नभो जलम् । ततो जालन्धरो बन्धः कण्ठदुःखौधनाशनः ।।
(ह.यो.प्र.३/७०-७१)

The neck & throat are contracted keeping the chin firmly on the breast bone. This *bandha* is known as *Jālandhara bandha*, which destroys old age & death. As it binds the *śirājala* moving in the downward direction & controls the fluid situated in the skull, it is called as *Jālandhara bandha.* It cures the diseases of throat due to

contraction of throat, *Pīyūṣa* does not mix with *Agni* nor there is aggravation of *vāta*. This *bandha* is mastered during *sarvāṅgāsana*.

Benefits

1. It regulates the flow of blood & *prāṇa* to the heart, the glands in the neck & head together with the brain.

2. *Prāṇāyāma* done without *jālandhara bandha* leads to dizziness.

Uḍḍiyāna bandha (उड्डियान बन्ध)

Uḍḍiyāna is the process of flying up. In *Uḍḍiyāna bandha* lift the diaphragm up the thorax & pull the abdominal organs against the back towards the spine. In *Uḍḍiyāna bandha*, the bird *prāṇa* flies up by the voluntary action, through *suṣumnā nāḍī* situated in the spinal colomn. It is the best among all *bandhas*. It is performed during the process of bāhya *kuṁbhaka*.

Benefits

1. It stimulates the diaphragm & all the abdominal viscera.

2. The cavity created by the lifting of diaphragm gives gentle massage to the muscles of the heart & tones of up the heart.

Satyābuddhi & Yogasiddhika buddhi (सत्याबुद्धि और योगसिद्धिका बुद्धि)

सर्वं कारणवद्दुःखमस्व चानित्यमेव च । न चात्मकृतकं तद्धि तत्र चोत्पद्यते स्वता ।।
यावन्नोत्पद्यते सत्या बुद्धिर्नैतदहं यया। नैतन्ममेति विज्ञाय ज्ञः सर्वमतिवर्तते।।(च.शा.१/१५२-१५३)

Any thing that has cause is misery, it is not related with soul & ephemeral. Misery is not produced by soul, but due to ignorance one feels that, he is the owner of soul. This false belief exists fill the dawn of Satyā buddhi ie real knowledge. The person realises that he is not born out of Ahaṁkāra and becomes liberated from all bondings and miseries.

Cessation of sukha & dukha in yoga approved by Āyurveda (योग एवं आयुर्वेदे सुख तथा दुःख निवृत्ति)

आत्मेन्द्रियमनोर्थानां सन्निकर्षात् प्रवर्तते । सुखदुःखमनारम्भादात्मस्थे मनसि स्थिरे ।।
निवर्तते तदुभयं वशित्वं चोपजायते।सशरीरस्य योगज्ञास्तं योगमृषयो विदुः।।(च.शा.१/१३८-१३९)

Association between soul, sense organs, mind & objects of sense organs, produce the feeling of happiness & unhappiness. Both the types of sensations disappear when mind is completely concen-

trated & blended with in soul & supernatural power. This state is known *Yoga* according to renouned sages of *Āyurveda*.

The characteristics of Mokṣa (Salvation)

मोक्षो रजस्तमोऽभावात् बलवत् कर्मसंक्षयात् । वियोगः सर्व संयोगैरपुनर्भवः उच्यते ।।
(च.शा. १/१४२)

Mokṣa is a state of absolute detatchment from all contacts by virtue of the absence of *Rajas & tamas* in mind due nullification of effects of past deeds.

Means to mokṣa (salvation)

सतामुपासनं सम्यगसतां परिवर्जनम् । व्रतचर्योपवासौ च नियमाश्च पृथग्विधाः ।।
धारणं धर्मशास्त्राणां विज्ञानं विजने रतिः । विषयेष्वरतिर्मोक्षे व्यवसायः परा धृतिः ।।
कर्मणामसमारम्भः कृतानां च परिक्षयः । नैष्क्रम्यमनहङ्कारः संयोगे भयदर्शनम् ।।
मनोबुद्धिसमाधानमर्थतत्वपरीक्षणम् । तत्वस्मृतेरुपस्थानात् सर्वमेतत् प्रवर्तते।।(च.शा.१/१४३-१४६)

- Respecting good people, abandoning company of bad people.
- Performing *Vṛta, upavāsa & niyama.*
- Profound knowledge about epics, disinterest towards people.
- No interest towards worldly pleasures & things.
- Performing good deals & abandoning all forms bad acts.
- Absence of ego (*Ahaṅkāra*).
- Fear of contact between mind, intellect & body.
- Deep concentration of mind and intellect in soul.
- Thinking and remembering about spiritual objects.
  नैष्ठिकी मोक्ष साधन हेतु ।।
- Absence of desires is means to salvation.

Features of Liberation (मुक्तात्मा लक्षण)

मुक्तात्मनः प्राणापानाद्यात्मलिङ्गाभावाद्गमकं चिन्हं नास्त्येवेति दर्शयति।।(च.पा.onच.शा.१/१५४-१५५)
तस्मिंश्चरमसन्यासे स मूलाः सर्ववेदनाः । ससंज्ञाज्ञानविज्ञाना निर्वृत्तिं यान्त्यशेषतः ।।
अतः परं ब्रह्मभूतो भूतात्मा नोपलभ्यते ।। निःसृतः सर्वभावेभ्यश्चिन्हं यस्य न विद्यते ।।
ज्ञानं ब्रह्मविदां चात्रनाज्ज्ञातुमर्हति ।। (च.शा. १/१५४-१५५)

The consciousness along with nonspecific, specific, and textual knowledge are completely eradicated soon after the final liberation of soul from the ephimeral body.

After this he attains features of *brahma*. At this juncture *Jīvātma* does exist and *ātma* is devoid of 8 *prakṛti* and 16 *vikāra*. The *ātma* has *brahma jñāna* and common person is unable to percieve it.

Chapter- 8
NAIṢṬHIKĪ CIKITSĀ

"चिकित्सा तु नैष्ठिकी या विनोपधाम् ।।" (च.शा. १/९४)
निष्ठा अत्यन्तदुःखमोक्षो मोक्षरूपः तदर्थभूता नैष्ठिकी । विनोपधामिति तृष्णां विना, तृष्णाशून्या प्रवृत्तिर्मोक्षफला भवतीत्यर्थः
नैष्ठिकी मोक्ष साधन हेतु ।। (च.पा.)

'Niṣṭhā' means liberation from miseries ie. in the form of salvation & the means for salvation is *Naiṣṭhikī*. It is devoid of *Upadhā* or desires. It is the way for the ultimate aim of life, one among four objects of human life, the salvation.

उपधा हि परो हेतु दुःखदुःखाश्रयप्रदः । त्यागः सर्वोपधानां च सर्वदुःखव्यपोहकः ।।
कोषकारो यथा ह्यंशूनुपादत्ते वधप्रदान् । उपदत्ते तथाऽर्थेभ्यस्तृष्णामज्ञः सदाऽऽतुरः ।।
यस्त्वग्निकल्पानर्थान् ज्ञो ज्ञात्वा तेभ्यो निवर्तते । अनारंभादसंयोगात्तं दुःखं नोऽपतिष्ठति ।।
(च.शा. १/९५-९७)
सदाऽऽतुरः-संसारदुःखगृहीतः । शरीराभावे निरायपमकारणकं दुःखं न भवतीति भावः ।

Desire is the root cause for all miseries. Sacrifice of all desires is the factor to vanish all miseries. As the silkworm weaves itself with suicidal threads, in the same way desire makes the person suffer from misery.

An intelligent person avoids the objects of senses, considering them as dangerous fire. He will be away from worldly pleasures. So that miseries can never conquer him, where as the ignorant person will always be bounded with worldly pleasures and miseries.

मूलं सर्वोपप्लवानां च प्रवृत्तिः ।। (च.शा. ५/८) रागद्वेषमूला प्रवृत्तिः ।। (च.पा.)
निवृत्तिः सुखमिति ।

Love hatred etc are called as attachment & they are the root cause of miseries & detatchement from the six enemies ie desire, hatred, greed, attachment, ego, jelousy is ultimate bliss.

निवृत्तिरपवर्गः तत् परं प्रशान्तं तत्तदक्षरं तत् ब्रह्मं स मोक्षः ।। (च.शा.५/११)
निवृत्ति मोक्षरूपायाः कारणमुपायः ।। (च.पा.)

Detatchment is ultimate peace, eternal and supreme. It is the right path to attain salvation.

Pravṛtti (प्रवृत्ति)

मोहेच्छाद्वेषकर्ममूला प्रवृत्तिः ।

तज्जा ह्यहंकारसङ्गसंशयाभिसंप्लवाभ्यवपात विप्रत्ययाविशेषानुपायाः तरुणमिव द्रुममतिविपुलशाश्वास्तरवोभिभूय पुरुषमवतत्यैवोत्तिष्ठन्ते प्रवृत्तेः संसाररूपयाः।। (च.शा.५/१०)

Attachment is produced by ignorance, desire and hatred. Ahaṁkara, Saṅga etc. arising from attachment overcome an individual as the large tree with many branches, overshadow smaller & young tree.

Ahaṁkāra (अहङ्कार)

तत्रैवंजातिरूपवित्तवृत्तबुद्धिशीलविद्याभिजनवयो वीर्यप्रभावसंपन्नोऽहं इत्यहंकारः।।(च.शा.५/१०)

Egoistic feeling such as I am endowed with best cast, beauty, money, intelligence, character, education, place, age, strength, influence etc.

Saṅga (सङ्ग)

यन्मनोवाक्कायकर्म नापवर्गाय स सङ्गः ।। (च.शा. ५/१०)

Deeds by body, speech & mind which are not conducive for the attainment of liberation are saṅga.

Saṁśaya (संशय)

कर्मफलमोक्षपुरुषप्रेत्यभावादयः सन्ति वा नेति संशयः ।। (च.शा.५/१०)

Doubt regarding existance of effect of past deeds, salvation, soul, life after death etc.

Abhisaṁplava (अभिसंप्लव)

सर्वावस्थास्वनन्योऽहमहं स्रष्टा स्वभावसंसिद्धोऽहमहं शरीरेन्द्रिय बुद्धिस्मृतिविशेषराशिरिति ग्रहणमभिसंप्लवः ।। (च.शा.५/१०)

Feelings such as I am first in any situation, I am creator, I am blessed person by nature, I have excellent state of health, sense organs, intelligence, memory etc.

Abhyavapāta (अभ्यवपात)

मम मातृ पितृ भ्रातृ दारापत्यबन्धुमित्रभृत्यगणो गणस्य चाहमित्यभ्यवपातः।। (च.शा.५/१०)

Attachment about father, mother, brother, wife, children, relatives, friends and servants. They belong to me & I belong to them.

Vipratyaya (विप्रत्यय)

कार्याकार्यहिताहितशुभाशुभेषु विपरीतभिनिवेशो विप्रत्ययः ।। (च.शा.५/१०)

One who does not know about what should be done, what should not be done. Ignorance about good, bad, conducive & nonconducive & acts opposite to that are called *Vipratyaya*.

Aviśeṣa (अविशेष)

ज्ञाज्ञयोः प्रकृतिविकारयोः प्रवृत्तिर्निवृत्त्योश्च सामान्यदर्शनमविशेषः ।। (च.शा. ५/१०)

Inability to differentiate between conscious & unconscious elements, nature & its modifications, attachment & detatchment is known as *aviśeṣa*.

Anupāya (अनुपाय)

प्रोक्षणानशनाग्निहोत्रभिषवणाभ्युक्षणावाहनयाजनयजन याचन सलिलहुताशन प्रवेशादयः समारम्भाः प्रोच्यन्ते ह्यनुपायाः ।। (च.शा. ५/१०)

Sprinkling of water along with chanting hymns, fasting, performing sacrifice in the morning & evening, taking bath thrice daily, sprinkling holy water, performing sacrifices, performing rituals, begging, entering into water & fire are known Anupāya.

Nivṛtti (निवृत्ति)

निवृत्तिरपवर्गः तत् परं प्रशान्तं तत्तदक्षरं तत् ब्रह्मं स मोक्षः ।। (च.शा.५/१२)

Detatchment is salvation. It is *Para* or absolute. It is peace, it is supreme (*brahma*), it is salvation.

उदयनानि मोक्षोपायाः इत्यर्थः।

The 40 ways to attain salvation are as follows.

तत्र लोकदोषदर्शिनो मुमुक्षोरादित एवाचायीभिगमन

(1) आचार्याभिगमन → Following the principles of preceptor such as ways to attain salvation.

(2) तस्योपदेशानुष्ठानं → Bringing the principles into action

(3) अग्नेरेवोपचर्य → Respecting fire

(4) धर्मशास्त्रानुगमनं → Following principles told in religious literature.

(5) तदर्थावबोधः → Understanding the real meaning of religious literature.

(6) तेनावष्टम्भः → To have patience to follow the procedures mentioned in religious text.

(7) तत्र यथोक्ताः क्रियाः → Performing the action as mentioned in texts.

(8) असतां परिवर्जनं → To leave the company of bad people.

(9) असङ्गतिदुर्जनेन → Abandon the company of bad people.

(10) सत्यं सर्वभूतहितं पुरुषं अनतिकाल परीक्ष्य वचनं । One should always speak truth, speak after thinking & speak words which are conducive for all beings & should not use harsh words.

(11) सर्वप्राणीषुचात्मानीवविक्षा → All beings should be considered as himself.

(12) सर्वासमस्मरणमसङ्कल्पनमप्रार्थनमनभिभाषणं च स्त्रीणां । Avoiding all contacts including remembering, thinking, requesting & speaking with women.

(13) सर्वपरिग्रह त्याग: → Avoidance of all belongings.

(14) कौपीनं प्रच्छादनार्थं → Small cloth for covering the body.

(15) धातुरागनिवसनं → Wearing saffron coloured cloth.

(16) कन्यासीवनहेतो: सूचिपिघलकं → Needle for sewing cloth.

(17) शौचधानतोर्जलकुण्डिक । → Water pot for cleanliness.

(18) दण्डधारण → Hold sacred stick.

(19) भैक्षचर्यार्थं पात्र → Bowl for auspicious begging.

(20) प्राणधारणार्थं एककालग्राम्यो यथोऽपपन्नोऽभ्यवहार: → Taking prescribed amount of food once a day to keep one self alive.

(21) श्रमापनयनार्थं शीर्णशुष्कतृणपर्णास्तरणोपधानं → Bed made of dry leaves, grass etc for taking rest.

(22) ध्यानहेतो: कायनिबन्धनं → Wooden plank for meditation.

(23) वनेष्वनिकेतवास: → Living in forest without home.

(24) तन्द्रानिद्रादिकर्मवर्जन→ Nonindulgence in drowsiness, lazyness, etc.

(25) इन्द्रियार्थेष्वनुरागोपतापनिग्रह: → Avoiding, love, hatred etc. & controlling sensory faculty.

(26) सुप्तिस्थितगतप्रेक्षिताहारविहारप्रत्यङ्गचेष्टादिकेष्वारम्भेषु स्मृति पूर्वका प्रवृत्ति: । To control hunger, sleep, thirst, efferts, moments, heat, happiness, miseries etc.

(27) शोकदैन्यमानोद्वेगमदलोभरागईर्ष्याभयक्रोधादिभि: असंचलनम् । Unperterbed by sorrow,miseries, respect, attachment, fear, jelousy and anger etc.

(28) अहङ्कारादिषूपसर्गसंज्ञा → Devoid of ego.

(29) सत्कारस्तुतिगर्हावमानक्षमत्वं → Always performing good action & unperturbed by praise, honour, critisism & result.

(30) लोकपुरुषयो: सर्गादिसामान्यावेक्षणं → Remembering the similarity between nature of universe, self & creation.

(31) कार्यकालात्यय भय → Afraid to post pone action which lead to salvation.

(32) योगारम्भे सततं अनिर्वेदा → Yogic practices.

(33) सत्वोत्साह: → One should develop *sātvika* qualities and enthusiasm.

(34) अपवर्गाय धी धृति स्मृतिबलाधानं → Intelligence, courage, memory & strength should be directed towards salvation.

(35) नियमनं इन्द्रियाणां चेतसि → Control over sense organs & mind

(36) चेतस अत्मनि, अत्मतश्च → Control of soul over mind & soul over himself.

(37) धातुभेदेन शरीरावयवसंख्यानामभिसमीक्षणं → Cognition of all the *dhātus* and organs intricatety.

(38) सर्वकारणवद्दु:खमस्वमनित्यमित्यभ्युपममः अस्वम् → आत्मव्यतिरिक्तं, अनात्मं Realization that all the noneternal worldly things are the cause for misery & do not belong to self.

(39) सर्वप्रवृत्तिष्वघसंज्ञा → Considering all factors which lead to attatchment as sinful.

(40) सर्वसन्यासे सुखमित्यभिनिवेश: । Complete detachment is the cause for happiness.

एषां मार्गोपवर्गाय

These are the ways for salvation.

Effect of practice of Yoga on Tridoṣās & Srotases

Health is a balanced state of *doṣās, dhātus, malās & Agni,* along with the srotases devoid of abnormality. *Yoga* helps in the maintenance of balance in healthy & establishment of balance in the ill.

Vāta– *Vāta* plays a key role in maintenance of health & causation of various diseases. It can be gradually controlled by the constant practice of *yoga*. *Prāṇāyāma* helps to control *prāṇa* and *Apāṇa vāyu,*

which are chief among the *vāyu*, through controlled breathing. Other limbs like *yama, niyama, āsana* etc also help to control the mind, inturn control the *vāta*.

Pitta– *Pitta* plays important role in digestion and assimilation of food along with metabolism. It can be stimulated by the procedures like *Agnisāra kriyā, sūrya bhedana prāṇāyāma, Dhanurāsana* etc. Cooling effect is brought about by *śītalī, sītkarī & chandra bhedana prāṇāyāma* in case of *pitta vṛddhi*.

Kapha– *Kapha* supports the body by its binding abilitiy & strength. It is also an important factor for immunity. Practice of *Āsanās* like *Bhujaṅgāsana, Dhanurāsana, prāṇāyāma* help to reduce the *kapha* & clarify the channels, which are blocked by *kapha*. Constant *practice* of *yoga* leads to increase in immunity, strength & with standing power.

Srotas– These are the channels through which flow of *doṣa, dhātu, mala, prāṇa* or energy takes place. Derangement of srotas leads to production of diseases. Practice of *Haṭha yoga* leads to purification of channels. (Ret.Ha.Yo.Pr.) Thus helps in prevention & cure of diseases like Asthma, bronchitis, atherosclerosis etc.

Effect on mental doṣās

The control of *vāyu* through prāṇāyāma leads to stability of mind. Following Yama, *Niyama, Dhāraṇa, Dhyāna* result in increase of *satva* quality, which leads to attainment of salvation. Psychologically peaceful state resuslts in prevention & cure of psycholigical & psychosomatic diseases.

Chapter- 9

NATUROPATHY

"Health is wealth". Health is not merely the absence of a disease, but is a positive quality of living body. Human health & happiness are governed by the laws of nature, which should not be violated. Life has anormous power in it. Disease of acute nature is a vital response and the body has innate ability to cure a disease, which is known as **vital power**.

Naturopathy believes in treating the diseases produced by nature by natural way i.e. by utilizinging five elements found in nature ie sun, air, mud, water, fasting & exercise. Another aspect is consumption of positive foods, which are beneficial for health.

History

Naturopathy grew out of the electic healing systems of 18th & 19th centuries. Philosophy was used in the Hippocratic school of medicine of about 400 BC. They used term "**Vismedicatrix Naturae**" in latin, which means "**The healing power of Nature**". The term 'Nature cure' was coined in 1895 by Dr. John School of New York. Dr. Benedict Lust (1872-1945) whose teachings initiated naturopathy in U.S. began using the term Naturopathy in 1902. Natural medicine flourished in U.S. up until mid 1930. Dr. John Harvey Kellogg (1852-1943) one of famous hydrotherapists, who introduced cornflakes in breakfast. Adolf Just (1859-1936) the auther of Return to nature is one more famous Naturopath.

Objectives of Naturopathy

1. To attain positive or superior health & maintain the health by means of natural principles.

2. Freedom from unrecognised, mild & severe sickness by the natural remedies.

3. Toxins accumulated in the body are causative factors for chronic & acute diseases, which can only be cured by means of nature, not by medicines.

Nature cure

Nature cure is a treatment modality, where natural measures are used in curing the diseases. It is a way of life in which man lives in harmony with nature. Mother nature will cure all the diseases. The nature cure differs according to different schools of thought.

1. Vincent Priessnitz from Austria – He observed & started treating people naturally in his own method.

2. Johannes Schrooth from Czechoslovakia was inspired by Vincent Priessnitz and adopted methods like hot & cold baths.

3. **Lui Kuhne** from Germany was cured by malignant cancer by nature cure. He is considered as the **father of hydrotherapy**, spinal bath, sitz bath, hipbath etc.

4. Henrie Lehman of Germany started his own naturopathy line of treatment.

5. Adolf Just– Brought an idea about naturalism. He was preaching that even human beings were like animals. There was no need of artificial things to live. He wrote a book called "Return to nature"

6. Henry Lindlahr from USA wrote many books on nature cure. He found Iridiagnosis ie. diagnosis on the basis of nature of iris.

7. Sabeistein Priest– He also gave importance to nature cure.

8. Hippocratus said that "Let food be thy medicine & medicine be thy food" & he also believed in healing power from with in ie. 'Vismedicatrix Naturae'. He also adopted certain natural ways in treatment.

9. Gandhiji and Laxman sharma in India also believed in Nature cure.

The philosophy of nature cure is based on sciences dealing with newly discovered & rediscovered natural laws & principles, with their application to phenomenon of life & death, health, disease & cure.

Nature cure is the system of building in harmony in man, with the constructive principles in nature on the physical, mental & moral planes of beings. It is both the way of life & concept of healing employing various natural means for preventing & treating diseases.

Constructive principles of nature cure

It is the principle which builds up, improves & repairs, and enhance vital power & which is opposite to the destructive principles in nature whose activity in nature, is designated as evolutionary.

Destructive principles

It is that principle which disintegrates & destroys the existing forms & types & whose activity in nature is designated as devolutionary.

What is normal or natural

Normal or natural is a substance which is in harmonic relation with the life of an individual.

Health

Health is defined as normal & harmonious vibration of elements & forces comprising of human entity on the physical, mental, moral planes being in confirmity with its constructive principles in nature applied to individual life according Lindlahr.

Physically– Joint movements, skin proper, normal bowel bladder, co-ordination of brain & parts, proportionate height weight, firm flesh.

Mentally– Response to various requirements of life, state of balance between himself & external world.

Socially– Relation between individual & society.

Spiritually– Unwritten laws.

Emotionally– Can with stand extremes of tortures.

Factor responsible for health

1. Life style 2. Environment 3. Genetic make up.

Disease

Disease is defined as abnormal or inharmonious vibration of elements & forces comprising the human entity on one or more planes of being, in confirmity with the destructive principles in nature applied to individual life "according to Henry Lindlahr.

Cause of disease

Including accidental or surgical injury to the human organism & surroundings, improper life style and violation of natures law leads to–

- lowered vitality
- abnormal components of blood & lymph.
- accumulation of waste matter, morbid materials & poison.

Acute disease

It is in reality the result of natures effort to eliminate waste material, foreign matter & poison from the organism to repair the injured living tissues. In other words, every acute disease is the result of cleansing & healing effect of nature.

Chronic disease

(1) It is condition of organism, in which vital vibrations are lowered due to accumulation of waste material & poison. This leads destruction of vital parts & organs. Chronic disease is an advanced condition, where the natures constructive & healing process are no longer able to act against the disease conditions.

(2) It is a condition of organisms, in which the morbid matter are accumulated so much, that the part of constructive forces of nature can not counter act the morbid filth.

Basic principles of Nature cure

1. Human beings are governed or maintained by the existence of a life force called vital force.

2. All diseases occur due to accumulation of morbid matter or toxin in the body, which lower the vital force.

3. Diseases are self initiated purifying attempts of nature. All acute diseases are self purifying attempts of human body. Chronic diseases happen due to continuous suppression of acute diseases or body's efforts to throw out diseases by conventional medicinal therapy.

4. Body has its own power to heal itself & healing occurs with in the body called as **Vismedicatrix naturae**.

5. Body & mind should be treated as a whole.

6. Cure can not be obtained without cleansing.

Factors providing vital force

1. Sleep– Sleep provides relaxation necessary for body & mind. It also helps to conserve the energy.

2. Sunlight– It enhances the vital force, gives energy, helps in synthesis of vitamin D & also has antimicrobial & antibacterial property.

3. Air– Gives life by supplying oxygen, pressure and breathing gives vital energy.

4. Water– Fresh water is most essential.

5. Food– Food is naturally available substance. Always positive foods should be consumed for preservation of vital force.

6. Mental make up– Anger, frustration, hatred, desire, greed, jealousy etc. leads to disturbed mind & intern to diseases of psychological & psychosomatic type. Mental peace enhances vital force.

7. Way of life– Busy life, smoking and alcohol adversely effect vital force & health.

10 Basic principles

1. Body heals itself.
2. Cause of disease enervation
3. Disease is produced due to metabolic residues.
4. Acute disease results due to cleansing mechanism of body.
5. Food does not enhance vitality, but builds the body.
6. Fasting helps the body to heal itself.
7. Germ is the secondary cause of disease.
8. Exercise & physical activity keeps the body in balance.
9. External treatment gives only relief.
10. Patients determination & faith in treatment & doctor is necessary for cure.

Pañcasūtra by Dr. Venkat Rao

Five important guidelines given by Venkata Rao for maintenance of health.

1. 2 meals a day
2. 8-12 glasses of water for drinking daily.
3. Exercise daily for one hour.
4. Pray twice daily.
5. Fasting once a week for one day.

Pañca Mahābhūta Siddhānta

Our body is made of *Pañcamahābhūta*. The diseases are caused by faulty habits of person & accumulation of toxins in the body. So these should be eliminated from the body by adopting natural substances.

Mud therapy – मृत् चिकित्सा – पृथ्वीमहाभूत
Hydro therapy – जल चिकित्सा – जलमहाभूत
Helio/Sun therapy – सूर्य चिकित्सा – अग्निमहाभूत
Prāṇāyāma – and Air bath – वायु महाभूत
Fasting – उपवास – आकाशमहाभूत

This is accepted by Indian scholars of nature cure.

At the back of the disease there lies a cause where medicine cannot reach. Hygiene is the only true science of rejuvenation, where vital economy is very important.

Drugs are inassimilable matter, poisonous in nature, so they should not be used. Body is having vital capacity, which can cure disease by nature.

Law of Dual effects– By Lindlahr

Every cause has two effects

1. Immediate or transient

2. Remote or more or less permanent or real effect.

Progression of disease

Acute disease → transient
→ considerable degree of health & vitality
→ Possible to remove by the cause & internal condition
→ By nature cure.
↓ ← If suppressed by medical violence.

Abnormality of that condition greately enhances.

↓

II stage → apparently milder
↓ but more deep rooted & obstinate

Chronic diseases
↓ drugs which are antivital

III stage → destructive disease
→ degenerative disease
→ every hour painful & miserable
→ death.

Retrogression

Degenerative distructive disease
↓ nature cure
Increases vitality
↓
Chronic disease
↓ nature cure
Enhances vitality
↓
Acute disease
↓ nature cure
Perfect vitality
↓
Health

Philosophy of Nature cure

- Life is the power behind all functions.
- Consciousness being behind life ie. the power of nature, the mother of cosmos.
- God or 'supreme' is the Lord of Nature.
- Concept of subtler & subtlest. Body has two parts
  - Gross ie. built from food.
  - Subtle comprises of principles like mind, life & cognate/ self/*Ātma*

●

Chapter- 10

HYDROTHERAPY

Father of Hydrotherapy is Lui Kuhne.

Hydrotherapy uses water to achieve therapeutic benefits. This can be used in various ways.

- Applied to areas of the body, or body parts can be immersed in water, combined with additives like essential oils, clay and epsom to alter its effects.
- It can be used in hot, warm, neutral, cold, ice or even steam from directly or via material like cotton towel.
- It is cheap, efficient, enjoyable & safe.
- It provides greater energy, improved skin function, appearance and better health.

Thermo-regulatory hydrotherapy

- It boosts up sex hormone production & regulates both potency in men & fertility in women.
- Renews energy as in chronic fatigue syndrome.
- It improves circulation, along with increase in levels of specific enzymes.
- Reduces chances of heart attack & stroke by improving blood clotting function.
- Increase levels of white blood cells & thus enhances immunity.
- Decrease of unpleasent menopausal symptoms.

Significance of water

(1) It is universal solvant which can dissolve many substances.

(2) Water is universally available in abundance & is cheap.

(3) It is non toxic & non irritating.

(4) It rapidly absorbs & holds good deal of heat, gives it easily without cooling very quickly.

(5) It can store energy. It can be converted from liquid to vapour or solid & useful in all states.

(6) It touches every part of body surface.

Mode of action

1. Application of warm or hot thing to tissues lead to the muscles relaxation & dilatation of blood vessels. This increases blood circulation to the tissue.

2. Short cold application contracts local blood vessels, which has decongesting effect on tissues & is rapidly followed by reaction in which blood vessels dialate & tissues are flushed with fresh oxygen rich blood.

3. Alternate hot & cold applications produce circulatory interchange & improved drainage & oxygen supply to the tissues.

4. Two important rules of hydrotherapy are, always cold application or immersion should be after hot application. Always heat applied should be bearable & never hot enough to scald the skin.

Basic principles for hot & cold application

1. Short cold application enhance circulation.

2. Long cold application decrease circulation & metabolism. (more than one minute).

3. Long hot application make the area congested & static & need cold application to restore normality.

5. Alternate hot & cold application lead to stimulation & depression of circulation.

6. Hot means 98-104^{0}F or 36.7-40^{0}C. Excessive heat is undesirable & dangerous.

7. Neutral application or baths at body heat are very soothing & relaxing.

8. Cold means 55^0-65^0 F or 12.7-18.3^{0}C.

9. Anything colder is very cold & warmer is cool. (66-80^{0}F) or (18.5-26.5^{0}C) or tepid (81-92^{0}F) or (26.5-33.3^{0}C) Neutral/warm (93-97^{0}F or 33.8-36.1^{0}C).

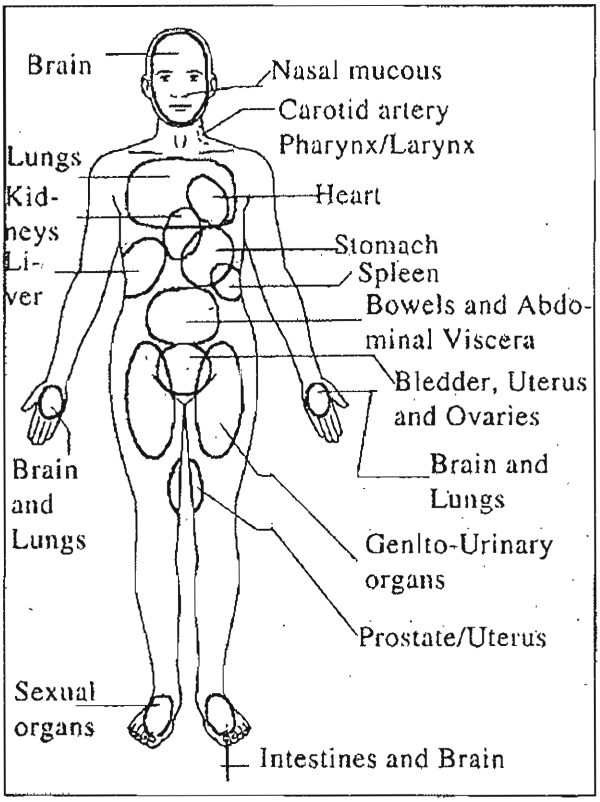
Reflexology of Hydrotherapy

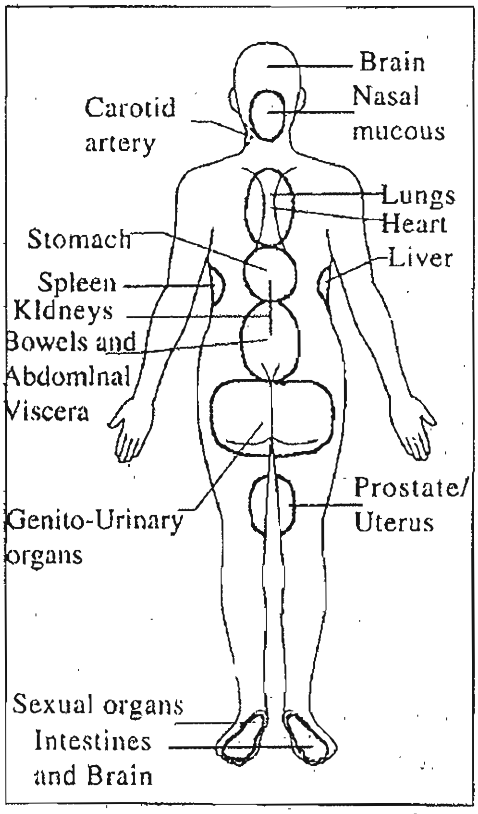
1. Circulation of head, chest, pelvic region especially bladder and reproductive organs are connected with skin of feet & hand.

2. Skin of lower breast bone is related with kidney.

3. Blood vessels of head are connected with skin of face.

4. Skin of base of neck with mucous membrane of nose.





5. Internal organs supplied by the nerves from spinal level (Upper spine- heart, lungs, stomach, liver middle spine, bowels & abdominal organs) are stimulated by skin of spinal region.

6. Skin of thighs, lower back & buttocks are connected with Genito urinary organs.

7. Prostate & uterus are stimulated by the skin of lower inner thighs.

To maintain health, energy, well being with inner & outer benefits, to restore & retain a highly efficient immune function, defend against infection & toxicity, to regain ideal positive health hydrotherapy is very useful, which is efficient & cost effective.

Thalasso therapy

'Thalasso' means 'the sea' in Greek. The term thalasso therapy is used for using sea water, beach sand, sea weeds, sea mud, & other substances derived from sea for treatment purpose. It is used in different forms as bathing, exercise and even drinking.

- Unpolluted sea water has antibacterial property due to minute plant life (plankton), which keep the sea pure.

- Sea water having 35g/l salt content is beneficial for treatment.
- Sea mud which contains algae & sea weeds is used in skin & rheumatic conditions.
- Dry & wet beach sand is used for heat application in various painful conditions.
- Sea water aerosols are used to help breathing problems. It contains health promoting negative ionization particles, which help in inhalation.
- Skin, circulatory, rheumatic, breathing conditions and fluid retentions can be treated by thalasso therapy.
- Walking pools designed to walk in different levels of water holding reiling, exercises in water etc. This is followed by 'Scottish' douche, which consists of high pressure spray or jet of cold or hot or alternating sea water, applied for short duration to achieve circulatory & reflex effects.
- After this treatment in specialised solarium, one should get exposure to sunlight (Ultra violet rays) and infra red (heat rays).
- Sea water containing salts of sulphur, magnesium and iodine is used in small quantity for drinking. Potassium content is useful in fluid retention & flouride content balances calcium metabolism.
- Water can be given internally by diluting with fresh water or juice for palatability.

Dose– 1-2 table spoon, in beginning to 4 table spoons tid gradually.

Different methods in hydrotherapy

- Heating compress
- Foementation (usually hot damp applications)
- Neutral bath (for anxiety reduction/pain relief)
- Full sheet pack (for relaxation & detox)
- Ice pack (for calming inflammation/easing pain)
- Steam inhalation (breathing problem/sinus congestion)
- Alternating baths (or single baths) sitz path or local immersion baths.

- Full baths of various types
- Exercising in water for numerous benefits
- Use of various additional substances in water.

Cautions for hydrotherapy

- People with poor circulation and low vitality should not be treated with extreme contrasts of temperature.
- One should not treat soon after meals, should wait atleast for one hour.
- Diabetics should avoid heat treatments to their legs.
- Hydrotherapy should not be used on extremely fragile skin, where skin conditions are irritated by moisture, over areas of numbness, where there are serious circulatory conditions.

Important notes

- Easiest & most convenient method should be chosen for application at home.
- More than one method should not be done on any one day.
- Some methods should be repeated every day or two for one or 2 weeks, especially in chronic conditions to get good results.
- Constitutional hydrotherapy & thermo-regulatory hydrotherapy should be continued for some weeks or month duration, because it modifies body functions and circulatory system slowly.

Compresses, Fomentations & Packs

Heating compress (in Europe called as cold compress).

Requirements– Single or double piece of cotton sheeting large enough to cover the area to be treated (double thickness for people with good circulation & vitality, single for moderate circulation & vitality).

- One thickness of woolen or flannel material (towel will do) larger then cotton material.
- Plastic material (of the size of woolen material).
- Safety pins
- Cold water

Procedure– Squeeze out the cotton material in cold water, so that it is damp but not dripping wet.

- Keep it over the painful area & immediately cover it with woolen or flannel material & plastic material & pin the covering properly in place.
- The compress should be properly fitted, so that it does not get cold but not so tight to obstruct circulation.
- Cold material should quickly become warm & patient should feel comfortable & after few hours, it will be virtually dry.
- The material should be washed before using it again, to remove acid waste absorbed form the body.
- Warming compress can be used upto 4 time/day, with atleast one hour gap in between. Ideally leave it over night.

Caution– For any reason if the compress is cold even after 10 minutes, then remove it & give brisk rub with the towel.

Indications– Painful joints, mastitis, sore throat, back ache, sore throat, tight chest from bronchitis.

Foementations

Requirements– Sheet, blanket, towels, very hot water, woolen material for foementation (towels).

- Bowl of water (mustard can be used to make super efficient).
- Bowl with cold water.
- Hot water (method 2)

(I) Procedure

Sit in chair with your feet in bowl of talerably hot water (104^{0}F/ 40^{0}C) in which 2-3 tsf of mustard powder is dissolved.

- Expose the area to be treated.
- Lightly squeeze out the woolen or towelling, so that fomentation material is very hot. (more water retained, the more effective the fomentation) & keep it immediately, between many layers of dry large towels.
- Apply the insulated hot towels to the painful area & cover it quickly with sheet & blanket.
- If fomentation is too hot, momentarily remove it, dry the skin & then replace it.

- Once in every 5 minutes change fomentation application & between each application, keep cold wet towel on the area for few seconds.
- After second fomentation or when sweating begins, apply a cold towel to the fore head.
- Apply it for 3 to 4 times.
- After removal of last fomentation use a damp, cold towel to rub the area & body quickly, excluding in case of dysmenorrhoea & then rest in a warm & comfortable position for 1/2 to 1 hour.
- If this treatment is done daily, skin should be protected with vaselin or some thing similar.
- It enhances sweating & elimination of toxic waste. It also releases local spasm & reduce pain.

(II) Procedure

- Lie down on sheet & blanket with hot water bottle kept below your feet.
- The insulation pack should be prepared as earlier & applied to the area to be treated.
- Cover with sheet & blanket, leave it for 4-5 minutes.
- Remove it & apply cold compress to head, before applying next fomentation.
- Apply it for 3 times.
- After completion rub off whole body using a towel.
- Wrap in sheet & blanket & rest for atleast for 1/2 an hour.

Indications– Pain, congestion especially involving muscle spasm & tension. Lumbago & neuralgia between ribs, Dysmenorrhoea and renal colic.

Contra-indications– Cancer, heart disease, diabetes, circulatory problems of legs, haemorrhage, sensitive skin.

Full wet sheet pack

Mode of action of pack depends on method of application. The treatment is very effective.

1. Initial cooling stage– Indicated in general weakness or if there is fever. Application is for not more than 5 min.

2. Neutral stage– The temperature of pack is same as that of the body, which has effects of **'neutral bath'**, indicated in agitation, anxiety and nervousness. This stage lasts for 1/2 an hour or how quickly body warms wet material.

3. Hot stage– Indicated in pain problems as sinus congestion, bowel discomfort & colitis.

4. Stage of profuse sweating– Indicated for general detoxification & elimination of drugs including tobacco. Used to enhance fever process in infectious conditions.

Contra-indications– Avoid 3 & 4 in case of severe anaemia very weak & debilitated condition. Do not use in skin conditions that aggravated by water. Diabetics should be given with care, some one should accompany the person to be treated to remove package.

Requirements– Two cotton sheets, 2 blankets, towels, pillow, hot water bottle, hand towel.

Procedure– Place the blanket fully open on the bed.

- Have a warm water bath, without drying, wrap a cold wet sheet, which should have water squeezed out at 60-70°F (15-21°C).
- Excess water can be left in towel in case of the young & vital person, but it should never be dripping wet.
- The wet cold sheet should be wrapped, so that it fits properly to the body up to the ankles & should be immediately covered by a second dry sheet before lying down on the blanket. This should be wrapped around neck to feet with no sheet visible.
- The second blanket should be placed over the first one & fitted properly.
- Use towels or neck pillow to support neck, where blanket may not be enclosing the pack properly.
- Keep a hot water bottle near the feet.
- Every thing should be done fast to avoid chilling.
- When 3rd & 4th stage have reached, cold compress for head should be applied, sips of water if thirsty should be given, to compensate water lost through sweat.
- Pack can be discontinued at any stage.

- For maximum benefit complete course of about 3 hrs or more depending on vitality is essential.
- If it is cold, remove the pack & give brisk rub.

Trunk pack

It is a modification of full body pack.

Requirenents– Large towel or a small blanket, strip of cotton material, safety pins, blanket.

Procedure– Fold a thick towel in 2 or 3 folds or take a piece of blanket, large enough to cover the area from armpits to umbilicus & long enough to go tight around with some overlap. Over this place one thick damp, well squeezed cotton material, which is atleast 2.5 cm. narrower than the covering material. It should be wrapped around once without over lap. Keep these on a bed & lie on top, wrapping the material over to cover the entire area between umbilicus & arm pits. Quickly fold & apply safety pin or have an assistant to do this. Then cover with a blanket & rest.

The cold damp cotton should warm quickly, if it is well wrapped, no damp edges projecting, not too wet & firmly pinned. If it fails to warm with in 5 minutes, then remove & give a friction rub & stop the treatment for the day. Best is sleep away with the pack.

Alternating hot & cold application (Constitutional hydrotherapy)

It has a nonspecific 'balancing effect'. Reduces chronic pains, enhances immune functions & promotes healing.

Requirements

- Full size sheet
- Two blankets (wool if possible).
- Three bath towels (when folded in 2 each should reach from side to side between shoulders & hips).
- Small towel
- Hot & cold water.

Procedure

- Undress & lie down in supine position between the sheets under blanket.
- Place 2 hot folded bath towels (4 layers) on the body covering shoulders to hips & side to side.

- Cover the body with the sheet & blanket & leave for 5 minutes.
- Return with one of layer (small) hot towel & one layer cold towel.
- Keep the 'new' hot towel on top of four layers of 'old' hot towels & slide, so that the hot towel is on the skin & remove the old towels. Immediately keep cold towel on the new hot towel & slide again, so that cold towel is on the skin, remove the single hot towel.
- Cover with blanket & leave for 10 minutes or until cold towel is warmed.
- The earlier cold & now hot towel should be removed & lie in prone position.
- Earlier steps are repeated on back.

Notes

- If bed is used then protect from becoming wet.
- Hot water temperature should be such that one can leave his hand for more than 5 seconds.
- 'Cold' water is coldest water running from the tap. In hot summer ice can be added to water.
- If one feels cold after cold towel in position, massage back, foot and hand through blanket or towel, or imagine a sunny beach.
- Apply daily or twice daily if necessary.

Ice pack

Ice decongests the tissues as it absorbs great amount of heat during liquifaction.

Indications– Sprains, injuries, bursitis & other joint swellings or inflammations, unless cold aggravates pain, tooth ache, head ache, haemorrhoids, bites.

Contra-indications– In acute bladder problems, abdominal application should be avoided, chest applications in acute asthma, health condition aggravated due to cold.

Requirements– Piece of flannel or wool material, towels, ice, safety pins, plastic, bandage.

Procedure– Place crushed ice in a towel upto thickness of one inch, then fold and pin the towel to hold it.

- Keep the wool or flannel material over the site of pain & put the ice pack over this.
- Cover the pack with plastic & tie it properly to keep it in place.
- Clothing & bedding should be protected with plastic & towels.
- Leave the pack in place for about 1/2 an hour & repeat the process after an hour if necessary.

Bathing methods

I. Depending on temperature

1. Neutral 2. Hot 3. Cold 4. Alternate

II. Depending on area

1. Sitz bath
2. Spinal bath
3. Hip bath — Full / Shallow
4. Foot bath
5. Head bath
6. Trunk bath
7. Piece cold friction bath
8. Full bath

III. Hydrotherapy with additional substances

1. Single oil baths
2. Oat meal bath
3. Mustard bath
4. Moor bath
5. Simple detox bath
6. Epsum salt bath

Neutral bath

Water which has temperature similar to that of body temperature, creates profound relaxing effect on the nervous system. Indications in anxiety, stress, chronic pain, insomnia, ideal in reducing conditions of fluid retention and general cardiac tonic.

Contra-indications– Skin condition which react adversely to water, serious cardiac disease.

Requirements– Bath tub, water, bath thermometer.

Procedure– Take a bath with water up to 97°F (36.1°C) not exceeding that level.

- Get into the bath where water covers the shoulders & support the back of the head with a towel or sponge.
- The thermometer should be kept in bath, so that temperature does not drop below 92°F (33.3°C).

- The water can be heated but should not exceed 97^{0}F. The duration of bath is from 30 minutes to 4 hour period, longer the duration better the relaxation.
- After bath dry with towel immediately & get into bed for atleast an hour.

Alternating bathing

It improves circulation, health, increases energy & complexion.

- Indicated in all conditions of congestion & inflammation, locally & generally & for tonic effect.
- Alternate Sitz bath is ideal in varicose veins & haemorrhoids.

Contra-indications– Haemorrhage, colic & spasm, acute & serious chronic heart disease, acute bladder & kidney infections.

Requirements

- Containers for keeping hot & cold water.
- If immersion of whole pelvic area is required, then large plastic (Hip hath/Spinal hath) tub, along with smaller containers for simultaneous immersion of feet.
- Bath thermometer.
- Hot & cold water.
- Special ingredients like mustard.

Procedure

- Local area should be alternately immersed in hot & cold water.
- Ice cubes can be added to cold water to enhance contrast.
- If area is not suitable for immersion, then alternate hot & cold pack should be employed.

Order of temperature

- 1-3 minutes in hot water 106-110^{0}F or 41-43^{0}C
- 15-30 seconds in cold (60^{0}F/15^{0}C)
- 1-3 minutes hot
- 15 seconds cold.

Sitz bath (मेहन स्नान)

Hot sitz bath is indicated for fast healing of painful anal fissure, haemorrhoids, dysmenorrhoea, prostate, bladder inflammation, Pelvic inflammatory disease & atonic constipation.

Requirement

Hip bath tub, hot & cold water, bath thermometer, towels.

Procedure

- If a hip bath tub is available, then sit in hot water (106-110°F, 41-43°C) with the feet in separate container of warm water.
- If regular bath is available, sit in hot water upto naval with knees bent & feet immersed.
- Apply a cold towel to the forehead. In case of anal fissure sit in tub for 30 minutes.
- For other conditions 8 minutes is adequate.
- At the end of bath, rub immersed area with towel squeezed out in cold water.
- If condition is prostate, hold the wet towel between legs for 10 seconds to cool the perineal area between rectum & testicles.
- In acute cystitis neutral sitz bath (for 30 min.) is useful.

Spinal bath (पृष्ठवंश/कटी स्नान)

Benefits– Of all baths most tonic for nervous system, through that to the whole body.

- Relieves tension & stress
- Health promoting

Requirements– Spinal bath tub, towels

Procedure– One should lie down in the tub, with the head on the side, with buttocks on opposite side & feet kept out side.

- It weather is cold, blanket can be used to cover the body.
- For the beginners thick wet pad of folded towel about an inch thickness should placed at the bottom.
- First an inch of cold water should be poured, which is moderately cold at first & gradually made colder.
- Gradually water level can be increased upto 4 inches if he wishes.
- If blanket is used should be covered from neck to feet.
- A folded wet towel can be placed over the chest & belly if one likes.
- Duration is 45 minutes, if he falls asleep, then till he wakes up himself.

- Once in 5-10 minutes bather can get up & properly rub the back with the towel.

When tub is not available

- Rubbing the back with towels with middle of it drenched in very cold water.
- Towel should be drenched repeatedly to maintain coldness.
- Patient should sit in a comfortable position & cold water should be poured on folded towel, which is kept over whole back from neck to waist.
- Duration 5-10 minute or till bather likes.
- All spinal baths should be ended with head bath.
- It can be taken at any time irrespective of meals.

Head bath– Cooling head & face by pouring cold water with a kettle or vessel from 10 to 20 minutes, so as to cool the brain.

Hip bath – Full hip bath

- Sitting in the spinal bath tub.
- He can rest his back on a plank placed against the wall while taking hip bath.
- Water should be moderately cold, if possible level should come upto naval.
- Body should be rubbed with towel drenched in water to stimulate the internal organs & stimulate the blood circulation.

Note

- In beginners, internal inflammations may be brought out & produce soreness & this is not due to friction. It is a healing crisis, so bath should not be discontinued.
- Bath should not be taken within 2 hours before/after meals.
- Chillness may be felt.

Shallow hip bath

It is ideal for patients with weak reaction.

- 1/2-2 lt water is poured into the tub which will just touch the buttock.
- Sitting position is same as full hip bath.

- Instead of small square napkin, a thick cotton glove can be put to right hand for rubbing the abdomen. Hand is dipped in water & the abdomen is rubbed in clockwise direction around the umbilicus.
- When hands are little warm again dip in cold water & rub, thus there is alternative warm & cold effect.

Note

- No chillness should felt as in full hip bath.
- Quick result.
- Duration of 5-10 min.
- Saves time, energy & gives greater benefit.
- End with head bath.

In absence of tub

Two wooden planks are taken. One is used for sitting another used as a back rest.

Cold water is kept in wide mouthed vessel by the right side of bather. Dip the hand in water & rub the abdomen around umbilicus in clockwise direction. The effect is similar to that of shallow hip bath.

Foot bath (पाद स्नान)

Foot bath tub should be filled with water. The feet must be dipped in hot water, which is bearable by the patient comfortably. The depth of water is advantageous. In the beginning the temperature should be low, more hot water should be added from time to time. In between one should sip cold water for better effects. It is having effects, similar to that of steam bath & can be used as substitute for steam bath. It promotes sweating. It can be simultaneously used with spinal bath or sitz bath.

Duration– 10-30 minutes

Indication– Cold, heavyness of head, rhinitis.

Contra-indications– High blood pressure, heart trouble, kidney, liver disorders.

Enema & its uses (बस्ति)

Objective

- Not to clear out the whole bowel, but only the end part of it.
- As a rule cold water should be used.

- Quantity should not be more than 10 ounces.
- It should be retained for the duration 5-10 minutes till water becomes warm.
- In course of time water can be reduced gradually to 6 ounces.

Benefits

- If administered daily tones up the bowels.
- No need for artificial bowel clearing aid.
- Subsides internal heat & dryness of internal bowel, which is the cause for chronic constipation.

Procedure

- Self administration
- Patient should lie in right lateral position & bring the buttock near the wall with knees bent.
- Lie in supine position with legs bent at knee, move close to wall & raise the legs & rest them on wall.
- The can should be at such a height on the wall, so that nozzle is slightly lower than the anus, when final position is taken.
- Enema tube should not be more than 3 feet long.
- The patient can help the entry of water by breathing out & keeping lungs empty.
- If there is pain due to obstruction of stools inside, the water should be stopped for few seconds & then opened again.
- Obstruction may also be due to blockage of nozzle by the faecal matter.
- In that case, it should be taken out, cleaned properly & inserted again.
- Water retention can be enhanced by massaging abdomen with wet hands.
- The patient may practice retaining water for longer period.
- Enema can be given after regular bowel movement, to bring out retained bowel.
- It can be repeated 2-3 times till bowel is fully cleaned.

Chapter- 11

STEAM BATH

Steam bath is a means to improve the power of reaction and to enable the quick elimination of toxic matter from skin. They help to enhance the vital power of reaction. Such baths are given in summer months in weak patients. It should be done with caution.

Full steam baths are violent. Most of the times the patients approaching for nature cure therapy are serious cases & failure of all other pathies. Such patients have very less vitalality & in such condition it may even have adverse effects.

Types

1. Local steam bath → Steam inhalation / Immersion bath / Sauna bath
2. Full body steam bath

Local steam baths are beneficial than full body steam bath in many conditions.

Advantages

1. It can be taken in convenient posture, sitting or lying down.
2. The part needed only can be exposed to steam.
3. Face is kept open & rest of the body is covered, to prevent the escape of vapours.
4. Spinal bath or cooling wet abdominal pack with wet pack over fore head & rest is beneficial after local steam bath.

Instruments used

1. Local steam bath → sauna
   → Foot bath tub
   → Spinal bath tub
   → Sitz bath tub.
2. Full steam bath → Steam chamber → In sitting posture
   → In lying down posture.

Details have been described in earlier chapter.

Chapter- 12

MUD THERAPY

Nature cure is the science which uses the internal healing power of man to prevent & cure the diseases, along with the natural substances available in nature, so the name itself explains 'nature cure'.

One among them is *"Mṛttikā cikitsā"* or mud therapy.

(I) 1. Spa mud

It is a mixture that is used for therapeutic purposes.

Components – Solid/telluric (natural clay)

– Hydro mineral (mineral water)

(algae & sea weeds) – Biological (micro-organisms & biomaterial).

Maturation is the process of colonization of mud, due to the growth of blue green algae & diatoms.

Method of preparation– Mud pack attains right therapeautic properties, when mud remains in 'maturation tanks' for 50-60 days in close contact with spa water, which constantly flows at 60^0C. During this process a typical microbial thermophilic, non pathogenic community develop, which cause important chemical & physical changes to the mud, enriching mud with precious active principles produced by metabolism.

Qualities

Increases rehydration volume.

Increases thermo insulating capacity.

Chemical fractions appear with anti inflammatory actions.

- In osteoparotic, an increase of specific metabolic parameter as a result of restored balance in the cellular activity related to bone remodeling occurs.
- In menopausal osteoporosis by comparing carbocalcitonin, mature mud therapy alone, calcium alone & combination of mud therapy & carbocalcitonin, the combination of carbocalcitonin & mud therapy has got greater effects as

recorded by biochemical assay & bone mineral density measurements.

- Increase of serum antioxidant defenses in arthrosis patients undergoing mud therapy is proven.
- Mud pack treatment influence chondrocyte activities in osteoarthrosis patients by modulating production of serum cytokines such as interleukin-1. Due to the presence of anti-inflammatory principle in mature thermal mud.
- Mud bath therapy influences nitric oxide, myeloperoxidase & glutathione peroxides serum levels in arthritic patients.
- Anti inflammatory & anti degrading factor, is best used in arthritic & osteoporotic etc. conditions.

2. Dry & wet beach sand

For application of heat as in covering painful joint conditions, sand is used. Condition of sand is decided according to disease.

3. Mud mask

Dead sea mud or black mud has 20 minerals & trace elements. It is used in masks.

II. French clay

It has the power to absorb & retain toxic products. This is taken from depth of 200 ft along bank of Pristine river. The clay free from sand is sun dried & used therapeautically. This contains large quantity of silica, iron, calcium, magnesium, zinc & enzymes.

It is of 5 types–

1. Green clay
2. Yellow clay
3. Premixed clay
4. White clay
5. Red clay

Indications

Internally– 1-2 tsf with one glass of water in conditions like rheumatism, asthma, allergy, food poisoning, headache, chronic abdominal pain.

Externally

Mask of green clay is used in general conditions.

Yellow clay– contains more sulphur & good for skin problem and poor metabolism.

White superfine clay – for sensitive digestion & irritated skin.

Premixed clay – insect bites, sprains, bruises.

Red superfine – fatigue

Purification of the mud

Mud is collected from a good area. The mud which is smooth and sticky is ideal. Mud should not be reused after one use. Harmful constituents should be removed. The mud should be clean, fine and smooth. It should be free from cowdung, glass, thorns, stones & pieces etc. It is pounded & sieved.

Yellow mud– Digestive disorder, abdominal disease, diabetes mellitus hepatomegaly, splenomegaly.

White mud– Brain, liver disorders.

Black mud– Poisoning, skin disease.

Red mud– Abdominal pain, Rheumatoid arthritis, paralysis.

Sandy mud– Near the river used in all condition snake bite, cholera, gastroenteritis.

Sand bath

The person is covered with warm sand, completely upto the neck. The head should be covered with cloth soaked in water or umbrella.

Duration– Depends on the type of disease.

Indication– Rheumatic pain, skin diseases, numbness, nervous disorders, indigestion, diabetes.

In rainy season sand should be used after frying.

Post sand bath procedure– cold water with spray pipe or immersion bath should be used for cleaning.

Mud therapy is of 2 types.

1. Whole body mud bath 2. Regional mud pack.

Chapter- 13
HELIOTHERAPY

Importance of sunlight

It is a form of energy, representing *Agni* among the *pañca mahābhūta*. It is the most essential element required for all the plants & animals in the universe for different purposes. It is required for a wide range of activities beginning from vision to the act of photosynthesis, most essential thing for sustenance of life. Plants can not grow in dark.

आरोग्यं भास्कारदिच्छेत् ।

It is also mentioned else where that health is given by sun god, so he was worshipped during *vedic* period to procure health.

Types

1. Basking in morning sun
   - (1) Direct exposure (Dr. Rollier)
   - (2) Indirect exposure (Dr. Louis Kuhne)
2. Mild sun bath
3. Walking sun bath
4. Louis Kuhne's sun bath – patients not too weak
5. Trunk pack sun bath – diarrhea, dysentry, caugh
6. Whole pack sun bath
7. Sun gazing (gaze through green leaves)

Palliative for heart diseases, BP, diabetes, nervous system disorders.

Time

The time should be with in four hours after sun rise & in the evening in the mild sun rays.

Methods of sun bathing

1. Basking in the sun

Morning time is ideal. It gives a pleasent feeling of warmth. It should be done in the mild sun in the beginning & later when one gets accustomed, warmer shine is also equally beneficial. It can be while sitting, walking or lying down on the ground. Head & the

face should be in the beginning shaded from the sun, until the body condition becomes tuned to its light & heat, so that there is no injury. Green banana leaves, any other leaf, white or green wet cloth can be used for this purpose. One should practice basking until a pleasent feeling of warmth is felt.

Later it may be continued till the onset of sweating. Then sweat should be wiped with towel till it is dry & bather may take spinal bath according to the condition.

In severe cases where greater weakness is present with less response, then prolonged exposure to the sun is recommended, but body should be covered with a piece of cloth kept wet by drenching it in cold water.

2. Mild sun bath

This bath is taken when sun rises high in the sky & heat is mild, ie. with in three hours after sunrise.

The patient should lie down on a bed sheet spread on the ground & remain almost naked wearing minimum cloth, covered with a thin dry cloth or shawl, till he gets warmed well. Then body should be covered with wet cloth dipped in water or green banana leaf. Face & eyes should be covered by wet cloth.

Time– Starting from 15 minutes can be gradually increased upto 40 minutes.

3. Walking sun bath

Walking in warm sunshine when sun is quite hot, with head & upper part of body covered by wet cloth. It is an easy way of taking sun bath.

4. Trunk pack sun bath

The sun bath can be taken in a spinal bath tub or other tub suitable for taking bath in lying posture. Place the tub in the sun with the head side in the shade & spread a thick cushion of porous wet cloth or turkish towel of half inch thickness, so as to come under back of the patient from neck to the hip.

When he lies down on it, a separate wet sheet should be laid for such length that, it may be more than enough to make a pack around the trunk with the edges overlapping. The patient should now lie down & have the pack by keeping the arms out of the pack.

Then whole body should be covered with banana leaf. When the pack gets dried by the heat of the sun, cloth should be drenched in cold water. So as to cool the weak patient.

Duration– Patient may lie down till he feels relieved.

Indications– Diarrhoea, dysentry, colic & cough.

Kuhne's sunbath

This bath is suitable only for robust patients. It is taken in the same way as the mild sunbath, but a dry cloth is covered on the body & wet cloth or green leaves are kept on diseased part, eyes & face. It is continued till sweating starts. The sweat is wiped off with a wet cloth. It may be followed by spinal bath or any cooling bath.

Duration– Not more than 50 minutes.

Sun gazing

For defective eye sight, gazing with the open eyes through a green leaf daily for 5-15 minutes at a time is good. After gazing or sometimes even before gazing, it is desirable to wash out the eyes by repeatedly applying balls of wet cloth dipped frequently in very cold water & partially squeezed to hold more amount of water.

Haṁsa water (Indirect mode of sunlight)

Sunlight is also used indirectly, by potentiating drinking water with sun light. The water is exposed to sunlight in a shallow wide mouthed container covered with banana leaf or any other leaf. Over this thin porous cloth is kept & tied properly, so that it does not fly by the wind. The whole day it is kept in sunlight. It is kept in the night, so that the cold quality of moon & dew gets imparted to water. Such water is known as *Haṁsodaka.* It may be used to drink, apply in the form of bandages or packs.

Mode of action of sun cure

1. Increases the blood circulation.

2. Sweating eliminates the toxic substances through skin (good for skin diseases).

3. Stimulates the digestive power. 4. Increases immunity.

5. Main source of Vitamin D. 6. Expansion of hair follicle.

Care– U.V. rays and infra red rays are very strong, they should not be exposed directly.

7. Stimulates synthesis of melanin pigments.

Chromotherapy

Chromotherapy is method of treatment of diseases by utilizing colours. It is supportive therapy, which helps in restoration of health.

According to practitioners of chromotherapy, the cause of any disease is due to the lack of particular colour in human system, by applying that colour, equilibrium will be established.

Red colour– It is symbol of heat, fire & anger. This stimulates & energizes. It stimulates arterial blood, brings about warmth to the cold extremities.

Uses– It is useful in low blood pressure, rheumatism, paralysis, anaemia, tuberculosis.

Orange– It symbolises prosperity & pride. It stimulates blood supply, energizes the nerves.

Uses– Kidney & gall bladder stones, hernia, appendicitis and also stimulates lactation.

Violet– It is useful in nervous & emotional disturbances, arthritis & acute cases of consumption & insomnia.

Yellow– It symbolises joy & happiness.

Uses– Laxative, diuretic, brain stimulant, useful in diabetes, indigestion, kidney & liver disorders, constipation, eye, throat infection, syphilis & impotence.

Purple– It is stimulant.

Uses– Constipation, hydrocele, leucorrhoea, stomach & uterine disorder, cataract, migraine & skin disorder.

Green– It symbolises harmony.

Uses– Nervous conditions, ulcers, influenza, malaria, colds, sexual disorder, inflammatory conditions, cancer.

Blue– It is cool, soothing & effective.

Uses– It alleviates pain, reduces bleeding, heals burns. Helps in dysentry, colic, asthma, hypertension, & abresion.

Method of treatment

1. By application of light through different colour glasses.
2. By external or internal use of colour charged water.

Chapter- 14

MASSAGE

Massage is useful measure for weak persons, who are not able to do exercise, safest massage is self massage. Massage should be done non violently. Massage can be described as passive exercise. Systematic rubbing or manipulating body parts is known as massage.

Conditions of massage

1. The masseur should possess better health than massaged. Otherwise it will be ineffective but also of lower vitality.

2. Masseur should have a good temperament.

3. The masseur should have good power, so that he can massage till the person feels relieved.

4. The nails of the masseur should be neatly cut to avoid any injury.

5. The masseur should wash his hands before massaging.

6. The masseur should be attentive to watch the reactions of the person.

Classification– They are mainly of three types.

I.
- → Ayurvedic massage– Away from the heart or in the direction of the artery.
- → Sweedish massage– Towards the heart or in the direction opposite to the artery.

II. According to material used.
- → Dry massage – It is done by using hands only, without any lubricant.
- → Powder massage – Medicated powders are used.
- → Oil massage – Oils are used.

III.
- → Dynamic
  - – Tickling – Kneading – Stretching
  - – Stroking – Vibrating
- → Static
  - – Pressing – Rubbing – Drawing
  - – Squeezing – Tapping
  - – Pinching – Poking
  - – Beating – Clapping

Sweedish massage has 7 movements

- Touch
- Stroking
- Friction
- Kneading
- Percussion
- Vibration
- Joint movements

Methods

1. Touch– Hands of the masseur comes in contact with the patient. It is of three types.

- Passive touch– Gives comfort, reduces pain & nervous irritability.
- Pressure touch– Reduces pain & increases blood supply
- Nerve compression– Done by hands, fingers & thumbs, has anaesthetic effect, stimulates muscles.

2. Stroking

It is touch with movement in single direction.

- Digital stroking – using figers
- Palmar stroking – using palms
- Knuckle stroking – using fist of hand or knuckle.

The movement is 2 to 3 inch per second. It has got sedative effect & beneficial in insomnia and hypersensitivity.

3. Friction

Hands are moved with considerable force.

- Centripetal – Done in the direction of venous drainage or towards the heart.
- Centrifugal – Done in the direction of artery towards the heart.
- Spiral – Done in spiral shape
- Rotatory – Rotatory movements are done.

It improves the circulation, mechanical drainage of blood, reduces local infection & generates heat.

4. Kneeding

- → Superficial– Superficial structures are pulled by using thumb & index finger.
- → Deep
  - → Petressage – Hold the muscle & pull it away from the bone.
  - → Rolling– Pull the muscle & move away from origin & insertion.

It increases the elasticity of the muscles, increases skin function. It also enhances blood circulation.

5. Percussion

Wrist of the hand is made lose & movement must be from wrist joint. Elastic blows should be used with various degree of force.

Tapping– With the finger tips.

Clapping– Hands made into cup shape & used for massage.

Beating– Fingers are bent & losely held for percussion.

Patting– Slow beats with palmar surface.

Contractilability of muscles gets enhanced. Also produces heat & vibration in the body.

6. Vibration

→ Superficial
→ Deep

Fine tremors or shaking movements, which are transmitted from hands of masseur to the patient. It produces contraction of muscles.

7. Joint movements

→ Stretching
→ Flexion
→ Extension
→ Adduction
→ Abduction
→ Medial & lateral rotation

Caution– Massage of abdomen should be done after evacuation of bowels & bladder.

Importance of body massage in the treatment

(1) Relieves the pain due to swelling or sprain. (2) Helps the absorption of effusions, relief of blood stasis & carrying away the morbid products in the system. (3) Deep massage helps the interchange of tissue fluids by increasing the circulation in the superficial vein & lymphatics. (4) It enhances nutrition in all tissues. (5) It removes fatigue, carrying away the increased products of combustion. (6) It enhances mechanical stimulation. (7) It enhances circulation. (8) It eliminates the waste products. (9) It improves condition of nervous system.

Chapter- 15

FASTING

Fasting is defined as "Complete voluntary abstinance from taking any kind of food for particular time, in order to give rest to digestive system". It helps to get rid of flesh tainted with toxic filth. 'Vital power' is engaged in eliminating the morbid foreign matter deposited in various parts of the body. It is one of the hygienic practices, which gives rest for digestive system & radical cure of diseases. It is one of the cheapest & important modes of treatment.

Classification

I. According to duration

- → Short duration – 2-5 days mainly with water & fruits
- → Intermittent – 1-2 days with *sātvika* diet
- → Long duration – more than 10 days

II. Depending upon the purpose of fasting

- → Political
- → Religious
- → Therapeutic

III. Depending on the method of fasting

- → Dry fasting – without drinking water.
- → Water fasting – for acute diseases
- → Juice fasting
  - → acidic – in obesity & respiratary disease
  - → alkaline – in kidney disorder diabetes.
- → Fruit fasting – weak person
- → Mono diet fasting – only one type of diet in meal.

IV. Depending on condition

- → Fasting in healthy
- → Fasting in acutely ill
- → Fasting in chronically ill.

Purpose of fasting

A man who treats his stomach unfairly, by injudicious eating ie. eating without hunger, by over eating etc man becomes sick. He can be cured of his illness by fasting or eating in less quantity. Highest level of vital economy is achieved by fasting. It is also considered as '*Prāyaścitta* for eating against the divine laws of health.

Effects of fasting

According to Çhāndogya *upaniṣad*, life is made of water, so one can fast on water alone, but not too long a time. Sunlight, air & ether help to sustain life during fast.

Body gets rid of the flesh tainted with toxic filth. The person feels weak as the body is in the process of eliminating foreign matter. It is temporary weakness.

Fasting in acute diseases

One should fast till the disease subsides & person has sense of lightness. One should break the fast in proper way and help to re-establish the health.

Fasting in chronic diseases

Long fasts are contra-indicated. Short fasts are recommended with proper interval. When patient is not fasting, positive foods which will not deposit foreign matter in the body should be taken sufficiently. As the life force is weak due to unhygienic living, occasional short fasts will be ideal to remove the accumulated morbid matter. Latent disease will be alleviated by right dieting & occasional fasting.

In case of chronic disease where there is no hunger, person may fast from 3-5 days. If there is no return of hunger, patient should take positive diet for few days & then again fast.

Method of fasting

Fasting is considered not from the last meal, but after the meal has been digested. One should drink water when ever he feels hungry. Daily from sunrise the faster should be without food for 6 hours or more, until natural hunger is experienced & then take light meal with positive food. If one takes 2 meals per day, it is ideal.

Chronically ill patients are unfit for fasting. They can be provided with highly positive drink, not more than four times per day.

Even fasting daily for few hours & for few days in a month can also be indicated. One should drink water when ever he feels thirsty.

Fasting in destructive diseases

Fast every day for few hours, Take less food which is light & positive in nature, Fresh fruits, vegetables, raw and uncooked food are indicated. Avoid milk, flesh & other heavy foods.

Acute effects of fasting on the body

1. Formation of gas – Disintegration of old putrid matter leads to gas formation.

2. Temperature increases in first few days.

3. Cotton mouth – Combination of morbid elements takes place & filth is expelled through mouth, leads to coating of tongue which is called as cotton mouth.

4. By third & fourth day mucous membrane of intestine starts eliminating morbid matter, indicated by foetid breath & coated tongue.

5. Bilious vomiting produced due to hepatomegaly.

6. Offensive perspiration again due to expulsion of morbid matter.

7. Breaking down of tissues produce increased worne out cells & other morbid matter.

Preparation– It is safe to prepare system for the fast through low protein diet, rich in positive minerals or raw food diet.

For prolonged fast supplement in the form of dilute acid, acid fruit juices which have neutralizing effect on toxins & elimination effect. They are splendid tonics, antiseptics & life elements.

Breaking the fast

Small quantity of light food, which can be digested easily like dilute fruit juices, tender coconut water, vegetable soups & thin butter milk should be taken. Later when digestive power increases, heavy foods can be consumed. After recovery always consume positive food in the required quantity.

●

Chapter- 16

SLEEP AND RELAXATION

Sleep is the physiological process to provide relaxation to whole body. It is one of the important factor which helps to maintain positive health. The replenishing of vital power is done by sleep. There is a rythm between the time of work & sleep. The rythm of sleep is controlled by circadian rythm. During the period of sleep, mind will be at complete rest.

According to nature cure, when brain & rest of the nervous system is filled with toxic morbid matter due to unwholesome practices, the person suffers from disease. By this mind becomes abnormal resulting in to restlessness & worry. The person fails to get proper sleep. This again makes the person sick. In this condition if one consumes medicines, this again leads to accumulation of toxic matter in the body & worsen the conditions.

Those who are healthy with normal nutrition, whose blood stream is clean can sleep well.

Treatment for sleeplessness

1. Accumulated toxic materials should be eliminated by the process of fasting, vegetablarianism & saving the vital economy.

2. Practice of *prāṇāyāma* regularly.

3. Restrict the diet to one meal per day & consume positive food.

4. Hot foot bath for 20 minutes followed by cold foot bath for few minutes induces good sleep.

5. Non violent enema is also beneficial.

6. Bedding should be firm comfortable with pillow not very high, very high pillows lead to impairment in circulation.

7. Avoid negative foods like coffee, tea, drinks, cigarettes etc.

Precautions to be taken during night awakening

One should fast completely or take some vegetables juices, raw salads, or fruits in small quantities.

Relaxation

Sleep is one of the ways of relaxation. But there are times when person needs relaxation, during day time without sleep.

Relaxation techniques

1. *Śavāsana* practice
2. Spinal bath
3. Cooling abdominal wet pack with wet pack over forehead.
4. Cooling head bath with few sips of cold water.
5. Singing or listening to music.
6. Repeating names of gods or human, reading holy book.
7. Spending time with hobby like painting sculpture.
8. Spending the time with mother nature.

●

Chapter- 17

NATURE CURE DIET

'Man is what he eats'. The person who consumes wholesome diet will be free from diseases. The naturopaths believe in positive foods, which help to eliminate the toxins deposited in the body along with that, the toxins do not get accumulated which are the causative factors for the diseases. At the same time they enhance the vital energy & thus enhance the immunity & help in prevention of diseases.

The vegetarians also are subject to diseases, through defects in their diet. They consume more of cereals & less amount of fruits & vegetables. Vegetables in place of cereals are more beneficial, which is considered as vegetablarianism.

Professor Arnold Ehret taught & practiced "Mucus less diet healing system". Vegetablarianism was based on the principles of Arnold, it is conducive to the bodily tissues. If vegetables are neglected, that lead to diseases as body gets loaded with mucus.

Quality of the soil where the food is grown is also important. The chemical fertilizers used for the crops destroy the natural humus & make the soil infertile. The poisonous pesticides sprayed to destroy the germs, but they are harmful for the body. The food of such kind leads to accumulation of toxins in the body & production of diseases.

Classification of food

- Positive foods (Primary foods)
- Negative foods (Secondary foods)
- Sātvika foods
- Rājasika foods
- Tāmasika foods

Positive foods (Primary foods)

They include vegetables & fruits, compared to cereals vegetables & fruits are of higher value. They are also known by the name primary foods.

Advantages

1. They have ample of cellulose or roughage & high water content. Hence they are light & easily digestable. They act as laxative.

2. They are rich in vitamins, organic minerals as salts which are alkaline & help to maintain alkalinity of blood.

3. They help in proper elimination of body waste & toxins accumulated in the body, which are the root cause for the production of diseases.

Negative foods (Secondary foods)

Cereals, grams, nuts, milk, eggs etc. are considered under negative foods or secondary foods. They are rich in carbohydrates, proteins & fats.

Disadvantages

1. They contain less amount of fibres & roughage, so they are constipating.

2. The food constituents are difficult to digest if taken in large quantity.

3. They are chemically acid forming & lead to ill health.

4. They are constipating, so promote accumulation of toxins which are causative factors for diseases. So most of the times they are sick.

5. Refined, manufactured, tinned, bottled, preserved foods do not have any health value. They are devitalizing, leading to chronic & destructive diseases.

6. Non vegetarian diet should be abandoned.

The fats which provide maximum amount of energy or calorie according to modern science are disturbing food factors & must be eaten in less quantity, even less than proteins.

All the foreign matters are acidic & to neutralize & eliminate it, alkaline constituents of the positive food are helpful. Inorganic alkalies are not used by the body, they are poisons & eliminated by fasting.

Most of the foreign matter is in the form of mucus. In its natural state, it serves as a lubricant & it is not harmful. But in an

abnormal state, it becomes viscous & produce diseases like cold & cough.

Proportion of positive & negative foods in diet

Healthy persons – Positive : Negative :: 2:1

Cure the ill health Positive : Negative :: 4:1

or Positive : Negative :: 5:1

In some cases in the early stages of treatment, give only positive foods, it is nothing but vegetablarianism. Leafy vegetables are best among the positive foods.

Among the fats, vegetable oils are better than animal fats. Hydrogynated oils are worst as they are artificially converted into saturated fats in presence of chemicals called as catalysts. These lead to development of chronic diseases.

Coconut is preferable to other nuts, as it has lot of roughage & less fat & can be digested easily compared to fried foods, which are unwholesome to the body.

Eggs are heavy composed of fats & proteins. They are difficult to digest & produce heart problems & other diseases.

Cereals have positive food factors like bran, germ of grain, which are removed by milling & polishing. Unpolished rice & hand milled rice are better than polished rice.

Milk is mucous forming food according to Arnold Ehret. Fresh raw milk can be taken by a healthy individual in moderate quantity as a substitute to meals. According to principles of Nature cure excess of intake of milk is not good for health.

Rules during the intake of food

1. Solid & liquid foods should not be eaten togather in a meal. It leads to delay in digestion.

2. Drinking water along with the meals is contraindicated.

3. Combination of protein & starch should not be eaten at the same meal.

4. Highly sour food should not be taken along with starch.

5. Fruits should be eaten at a different time.

6. Vegetables combine properly with starch & proteins.

7. Oil goes well with both starch & protein, but should be used in less quantity. Frying is again contraindicated.

8. Half the meal should consist of salads ie. raw foods.

9. Different vegetables cut into pieces, flavoured by few drops of lemon juice, coriander leaves & coconut scrapings. Fresh sweet acids in small quantities can be used.

Diet therapy in common diseases

1. High blood pressure

Fresh fruits & vegetables should be consumed in higher quantity. Start the treatment with exclusive fruit diet for atleast one week.

Fruits– Oranges, apples, pears, mangoes, guava, pine apples, raspberry & water. Avoid Jackfruit & banana.

Raw vegetables are beneficial in hypertension. Cucumber, carrot, tomatoes, onion, radish, cabbage, & spinach are best consumed in salad form in raw condition.

Garlic is most effective in hypertension, relieves dizziness, numbness, shortness of breath & abdominal distension. Indian gooseberry (amla) juice with 2 teaspoon with honey is beneficial.

Lemon juice along with peel of fruit is also beneficial, watermelon is also helpful. After one week of fresh vegetable, fruit diet change over to positive diet.

2. Arthritis

Vegetables– Cabbage, carrot, celery, cucumber, lettuce, onion, radish and tomatoes in raw condition.

Cooked vegetables– Beets, cauliflower, cabbage, carrots, brinjal, turnips, onions, peanuts, beans, spinach, tomato squash.

Vegetable juice– Any of vegetable juice, fresh pineapple juice help to reduce swelling & inflammation. Alkaline action of raw juices dissolves the deposit around the joints & other tissues. Potato juice therapy is also beneficial in rheumatic & arthritic conditions. Green gram soup with crushed garlic cloves & teaspoon full of fenugreek powder is also beneficial.

3. Asthma

Intake of positive food & avoidance of mucus forming diet is beneficial. Along with that enema will be helpful. Honey & garlic are also beneficial.

4. Constipation

· Unrefined food such as whole grain cereals, bean, honey & lentils, green & leafy vegetables especially spinach, french beans, tomatoes, lettuce, onion, cabbage, cauliflower, brussels, sprouts, celery, turnip, pumpkin, peas, beets, carrot, fresh fruits, especially peas, grapes, figs, papaya, mangoes, grape fruit, gooseberries, guava and oranges.

Food should be chewed well.

Avoid white flour, rice, bread, pulses, cakes and pastries.

Juice therapy

1. Juice of ash pumpkin effective in relieving discomfort in digestive system due to excessive acidity and acute stomach pain.

2. Juice of banana stem is well known remedy for digestive & urinary disorder, kidneys, liver and gall bladder disorders. They help to eliminate toxin from the body. Clears cholesterol & blood clots.

3. Tender coconut juice is good to achieve electrolyte balance and reduce inflammation. They are beneficial in diarrhoea, cholera, dysentry etc.

4. Juice of Indian gooseberry is beneficial in many disease like premature grey hair, irritable temper, loss of patience, diabetes mellitus etc.

Chapter- 18

PRIMARY HEALTH CARE

Definition (स्वास्थ्य संरक्षण परिभाष)

Primary health care is essential health care based on practical, scientifically sound & socially acceptable methods & technocology made universally accessible to individuals & acceptable to them, through their full participation & at a cost the community & country can afford.

Elements of Primary Health Care (महत्वपूर्णअंग)

In Alma Atta declaration in international conference held at Alma Atta (USSR) in 1978, 8 essential components were outlined.

1. Education concerning prevailing health problems & methods of preventing & controlling them.
2. Promotion of food supply & proper nutrition.
3. An adequate supply of safe water & basic sanitation.
4. Maternal & child health care.
5. Immunization against major infectious disease.
6. Prevention & control of locally endemic diseases.
7. Appropriate treatment of common diseases & injuries.
8. Provision of essential drugs.

Principles of Primary Health Care

1. Equitable distribution
2. Community participation ← Man / Money / Materials
3. Intersectorial co-ordination
4. Appropriate technology

1. Equitable distribution

There should not be any difference between caste, sex, region, nationality, rich, poor, urban and rural. Every one should have facility for primary health.

2. Community participation

Local resources such as man, money & material power are also essential. Eg. Health guides, trained dais etc.

Involvement of community, individual & family is the most essential aspect in community health, along with the action of the state & the central Govternment.

3. Intersectional co-ordination

Along with the health sector, all related sectors should actively partcipate in the community development, in particular agriculture, animal husbandry, food, industry, education, housing, public works, communication & other sectors.

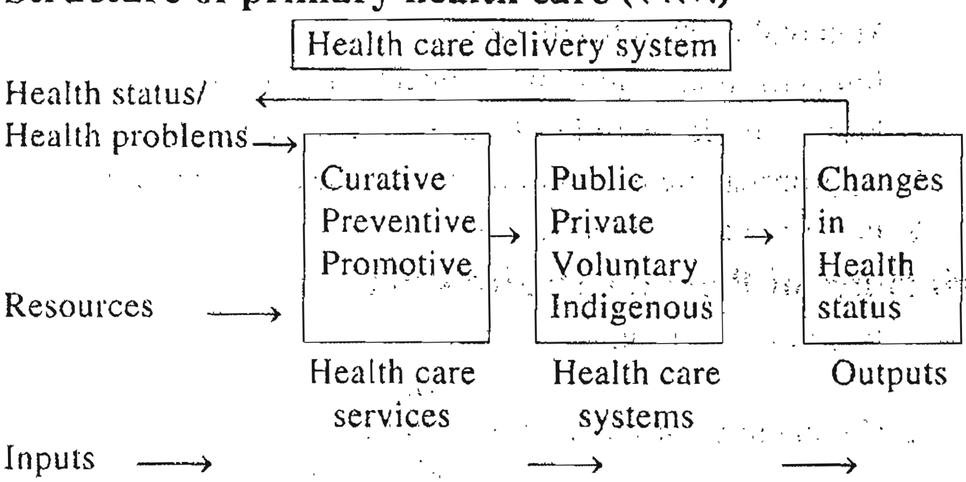
4. Appropriate technology

It is defined as scientifically sound, adaptable technology to the local needs & acceptable to those who apply it & those for whom it is used, can be maintained by the people themselves.

→ HFA by 2000 AD.

Attainment of a level of health that will enable every individual to lead a socially & economically productive life.

Structure of primary health care (स्वरूप)



Curtecy SPM. Park.

Analysis of health status & Health problems

1. Morbidity & mortality statistics
2. Demographic condition of population
3. Environmental conditions which have bearing on health.
4. Socio economic factors.

5. Cultural background, attitudes, beliefs & practices.

6. Medical & health services.

7. Other services.

Health problems

1. Communicable disease – Malaria, Tuberculosis, Diarrhoea ARI, Leprosy, Filaria, AIDS.

2. Nutritional disease– PEM, Anorexia, low birth weight Xerophthalmia, IDD.

3. Environmental hygiene.

4. Medical care– Finance inadequate.

5. Population problems– Biggest problem.

Resources

1. Health man power 2. Money & material 3. Time.

Health care systems in India

Public Health sector

I. Primary health care–

(a)
- Primary health centre
- Sub centre

(b)
- Hospitals/Health centres
- Specialist hospital
- Community health centre
- Teaching hospital.
- Rural hospitals
- District hospital/health centre

(c)
- Health insurance scheme
- CGHS
- Employees state insurance

(d)
- Other agencies
- Defence services
- Railways

II. Private sectors–

(a) Private hospitals, polyclinics, nursing homes, dispensaries

(b) General practitioners & clinics.

III. Indigenous systems of medicine–

- Ayurveda & siddha
- Unani, Tibbi
- Homoeopathy
- Unregistered

IV. Voluntary health agencies.

V. National Health programmes.

Primary Health Care in India

Levels of Health care

1. Primary care level
2. Secondary care level
3. Tertiary care level

National Health Policy based on Primary health care approach came into existence with the objective of HFA by 2000.

1. Village level
2. Subcentre level
3. Primary health centre level
4. Community health centre.

1. Village level

Under equitable distribution of health resources, following schemes were started.

a. Village health Guide scheme
b. Training of local Dais
c. ICDS scheme

Village Health Guides were implemented at village level. Scheme was started in 2nd October 1977.

- Females are chosen by the community.
- They act as link between community & Governmental infra structure.

Selection

- Permanent resident of community, preferably a women.
- Who is able to read, write and education atleast upto 6th standard, should be acceptable to all sects of community.
- She should spare atleast 2-3 hrs/day for work.

Training

It is conducted in the nearest PHC. Stipend of Rs. 200 is given per month. Training is given for 200 hrs in 3 month.

After training

They recieve working manual & kit containing medicines belonging to modern & traditional systems of medicine.

Duties

- treatment for simple ailments.
- First Aid.
- Maternal & child health care with family planning.

- Health education
- Sanitation of the community.
- Honorarium of Rs. 50/ month, drugs worth Rs. 600/ annum is provided.
- 4.1 lakh village health guides are working. Target is one health Guide for 1000 population or a village.

Local Dais

Under rural health scheme, Local dais are trained to conduct delivery.

Training

1. Basic concepts of maternal & child health, sterilization & obstetric skills are taught.

2. 30 days training is given with Rs. 300/month stipend.

3. Training is conducted at PHC or sub center or MCH for 2 days/week. Other 4 days she accompanies the female health worker.

4. Atleast 2 deliveries should be conducted under guidance.

After training

1. Delivery kit & certificate will be provided.

2. She recieves Rs 10/ delivery. When registered at PHC or subcentre, for each infant registration, she gets 3 Rs.

3. She plays an important role in family planning advices.

Medical officer at PHC

He is the head of health team. In the morning hours he treats the patients in out door. In afternoon he supervises the field work. He visits subcentres on fixed days & hours, provides necessary guidance. He plans, promotes, directs, supervises & co-ordinates as well as evaluates the works under progress.

Health worker female (HWF)– Functions of HWF include

1. Registration of cases.
2. Care at home
3. Care at PHC
4. Care in the community
5. Other health services.

Health worker male (HWM)– Functions of HWM include

1. Record maintenance
2. Malaria indentification & treatment

3. Communicable diseases 4. Leprosy identification
5. Tuberculosis indentification 6. Environment sanitation
7. Expanded programme on immunization implementation.
8. Family planning implementalion.

3. Health Assistants (Male & Female)

One Health assistant supervises 6 health workers. The functions include administration, proper communication, strengthening knowledge & skills and supervision.

Anganwadi worker

Under ICDS, one worker is selected for 1000 population by the community. Training in the aspects of health, nutrition & child development for 4 months will be given. She is a part time worker with a pay of Rs. 200-250/month.

Duties

- Health checkup
- Health education
- Immunization
- Nonformal preschool education
- Supplementary nutrition
- Referal services

Beneficiaries– nursing mothers, women & children below 6 yrs.

Sub centre level

One subcentre is established for 5000 population. Generally in hilly, tribal & backward area, one centre is established for 3000 population. It is equipped with one male MPW and one female MPW (Multi Purpose Worker).

Sevices provided

- Mother and child health care.
- Immunization.
- Family planning.

One female health assistant supervises and guides work of 6 female Health workers.

Primary Health Centre

One PHC for 30000 Rural population and one PHC for 20000 hilly, tribal, backward area population is established.

Functions of PHC

1. Medical care 2. MCH including family planning

3. Safe water supply & basic sanitation
4. Prevention & control of locally endemic disease.
5. Collection & reporting of vital statistics
6. Education about health
7. National health programme.
8. Referral services
9. Training of health guides, HW, HA & local Dais
10. Basic laboratory facilities.

These comprise of all essential elements of primary health mentioned in Alma Atta decleration.

Services provided at PHC

- Some surgical procedures like Vasectomy, Tubectomy, MTP.
- Re-orient medical education (ROME programme).
- 3 PHCs are attached to one medical college.

Staff

M.O.	–	1
Pharmacist	–	1
Nurse or midwife	–	1
Health worker (F)/ANM	–	1
Block extension educator	–	1
Health assistant male	–	1
Health assistant female	–	1
UDC	–	1
LDC	–	1
Lab technician	–	1
Driver	–	1
Class IV	–	4
		15

Subcentre

Health worker/ANM (F)	–	1
Health worker/male	–	1
Voluntary worker	–	1
		3

4. Community Health Centre

80,000 to 1.2 lakh population is covered under one community health centre.

It comprises of 30 beds.

- Specialists in surgery, medicine, OBG, paediatrics, X-ray, Lab are working.
- Community health officer – 1 non medical person from PHC supervisory staff, with experience of alteast 7 yrs in Rural health programme is selected.

Staff

Medical officer	– 4
Nurse midwife	– 7
Dresser	– 1
Pharmacist or compounder	– 1
Lab technician	– 1
Radio grapher	– 1
Ward boys	– 1
Dhobi	– 1
Sweeper	– 3
Mali	– 1
Chaukidar	– 1
Aya	– 1
Peon	– 1
	25

The possible contribution of Āyurvedic mode of treatment in present time

Āyurveda is one of the most ancient sciences. It is the science of life. The contributions of *Āyurveda* in present day can be mainly of two types ie. preventive & curative.

स्वस्थस्य स्वास्थ्य रक्षणं किञ्चिदार्तस्य रोगनुत् ।

Preventive aspects

These can be categorised into three types i.e. diet, regimen & medicine.

Diet (Āhāra)

One should consume conducive diet, at proper time, in proper way, avoiding nonconducive food i.e. *viruddha*.

Regimen

Daily regimens starting from getting up in the morning till sleep, seasonal regimens, *sadvṛtta* & *ācāra rasāyana* help in prevention of disease & maintenance of health.

Medicine

Drugs which are having rejuvenating property, strength promoting & virility enhancing should be used for prevention of diseases, enhancing strength & immunity.

Curative aspects

Diseases are of two types. Acute & chronic. In the acute conditions most of the times the patients prefer Allopathic medicine, as far as chronic diseases, *Āyurveda* has got good effect.

Concept of *Pañcakarma* is the greatest contribution, which are very much beneficial to the body in both chronic & degenerative disorders. The medicines also enhance the immunity & many medicines have anti oxidant property, which help in rejuvenating.

Chapter- 19

FAMILY WELFARE PROGRAMME

Population Explosion

Demography is scientific study of human population. It emphasizes on three phenomena namely changes in population size, composition of population & the distribution of population in space. It deals with fertility, mortality, marriage, migration & social mobility.

Demographic changes

There are five stages in the demographic cycle.

First stage (High stationary stage)– High birth rate & high death rate, where population is stationary. India during 1920.

Second stage (Early expanding)– The death rate begins to decline & birth rate remains same. Ex. many countries in South Asia & Africa.

Third stage (Late expanding stage)– The death rate decreases further, with the decreasing birth rate. Birth exceeds death Ex. Developing countries like India, China etc.

Fourth stage (Slow stationary)– Stage with low birth rate & low death rate resulting in stationary population Ex: UK, Denmark, Australia.

Fifth stage (Declining stage)

The population starts to decrease due to lower birth rate than the death rate. Ex: Germany, Hungary.

The problem of population explosion

Uncontrollable population growth is known as population explosion, which poses various problems in the community.

Causes for population explosion in India

1. Early marriages enhance the fertility rate. There are chances of more child birth.

2. Duration of married life is more.

3. If all births are post poned for one year then there is decrease in total fertility rate. In India family planning is not adopted by many people.

4. Education status & fertility are inversely proportion. Literacy rate is low in India

5. Economic status & fertility are also inversely proportional.

6. Muslims have higher fertility rates compared to Hindus due to religious customs.

7. The effect of nutrition & fertility is indirect. The obese have less fertility rate.

8. Family planning procedures reduce fertility rates.

Population increase & economic progress

Increasing population is a hinderance in economic progress. Most of the countries which are economically forward or considered among the developed country are in slow stationary stage or declining stage. Due to the increase in population poverty, illiteracy and unemployment become major problems. They act as obstacle in the path of economic progress.

The speciality of population & quality of life

Quality of life is defined as composite measure of physical, mental and social well being as percieved by each individual or by group of individuals that is to say, happiness, satisfaction and gratification as it is experienced in such life concerns as health, marriage, family work, financial situation, educational opportunities, self esteem, creativity, belongingness and trust in others. It is subjective component of well being.

The people wish to achieve better quality of life. The level of living effect the quality of life, many a times economic progress is necessary to enhance the quality of life. In other words quality of life & economic status are directly proportional. Economic progress & population increase are inversely proportional. So population increase lead to decrease in quality of life.

Population increase and environment

External factors living & non-living, material & non-material which surround man is known as environment. Man's health is dependent on surrounding environment. Water pollution, air pollu-

tion, soil pollution, poor housing conditions, presence of vectors in the surroundings may produce many health hazards. Control of environmental pollution is one of the preventive measure. The increase of population enhances environmental pollution & difficulty in implementation of control measures. Population explosion poses problems of waste disposal, excreta disposal, industrial pollution etc which cause environmental pollution.

Relationship between general education & population education

General education is the factor which influences the health. Illiteracy is generally associated with poverty, malnutrition, illhealth & high infant and child mortality rates. It is an important element of economic & social development. Literacy is component with modernization, urbanisation, industrialization, communication & progress, literates have the knowledge about health and prevention that act as a barrier between illness.

Population education is educational programme which provides education to the population, about a situation in the community, nation & world with the purpose of developing a specific, subject which brings about change in attitudes and behavior towards that situation".

Various principles of population & population policy in India

Population policy is the policy designed to decrease the birth rate or growth rate. In India first population policy was framed in 1976. It increased the legal age for marriage of females from 15 to 18 years & 18 to 21 years for males.

In 1977 programme was modified with priority for **small family norms,** without compulsion and changed the programme title to **family welfare programme**.

In 1983 National health policy had set the long term goal of achieving net reproductive rate of one by the year 2000.

National population policy 2000 is latest policy. It deals with women education, improved health & nutrition, child survival & health, health care of urban slum, tribal area, adolescent health & education along with NGO collaboration.

Objectives of NPP 2000

1. To bring the total fertility rate to replacement level by 2010.

2. To achieve economic growth, social development & environment protection.

Targets to be achieved by 2010

1. To achieve basic RCH services, supply & infrastructure

2. Free & compulsory school education upto age of 14 years.

3. Decrease infant mortality rate below 30 per 1000 live births.

4. Decrease maternal mortality rate below 100 per 10,000 live births.

5. Achieve universal immunization

6. Promote delayed marriages.

7. To achieve 80% of institutional deliveries & 100% deliveries by trained persons.

8. Achieve 100% registration of births, deaths, marriage and pregnancy.

9. Prevent & control communicable disease

10. Prevent spread of AIDS, RTI & STD.

11. Integrate ISM in RCH & in reaching out house holds.

National Family Welfare Programme

History

It was started in the year 1952, with nation wide family planning programme. In the beginning few clinics were established along with distribution of educational materials, training & research.

(1) During the third five year plan (1961-66) family planning was the centre of the programme. The pure **clinic approach** was transformed into **education approach**, to make the people accept small family norms. The introduction of Lippe's loop in 1965 & separate Department of Family Planning in 1966 in the Ministry of Health were important measures. During 1966-1969 the programme took deep roots. The infrastructures include PHC, subcentres, urban family planning centres, district & state bureaus.

(2) During fourth five year plan (1969-1974) Govt. gave great importance to the programme. The programme was important part of MCH services of PHC. All India Hospital Post partum programme

was started in 1970, Medical Termination of Pregnancy MTP was introduced in 1972.

(3) During Fifth five year plan (1975-1980) major changes took place. First National population policy was started during 1976. Forcible sterilization campaign lead to the defeat of congess in 1977. Later the ministry of Family Planning was renamed as **Family Welfare**.

Characteristics & Achievements

During 1977-78, the 42nd amendment of constitution was made for population control & family planning. The acceptance of the family planning is by voluntary act. Rural Health Scheme started during 1977. The local people were involved in the health related matters. Health guides, trained Dais and opinion leaders were involved in the programme actively.

During 1978 Alma atta declaration was signed by India and 'Primary health approach' to the achievement of Health for all by 2000 AD was accepted. National Health Policy was framed in 1982.

The universal immunization programme began in the year 1985-86 with the intention of reducing mortality & morbidity of children.

Oral rehydration therapy was started, to prevent the deaths due to dehydration due to diarrhoea.

During 7th five year plan MCH was introduced with the objective of mother & child health.

In 1992 these programmes were integrated under child servival & safe motherhood (CSSM) programme.

In 1994 Reproductive & Child Health (RCH) programme was started. According to 9th five year plan the RCH integrates all the related programmes of 8th five year plan. National population policy 2000 was framed during year 2000 to promote family welfare.

Expenditure under programme from first to 5th five year plans.

Period	*Expenditure in crores*
First plan 1951-56	0.65
Second plan 1956-61	5.00
Third plan 1961-66	27.00

Period	*Expenditure in crores*
Annual plan 1966-69	82.9
Forth plan 1969-74	285-8
Fifth plan 1974-79	285-6
Annual plan 1978-79	101.8
Annual plan 1979-80	116.2
Sixth plan 1980-85	1309.00
Seventh plan 1985-90	2868.00
Annual plan 1990-91	675.00
Annual plan 1991-92	749.00
Eighth plan 1992-97	6195.00
Ninth plan 1997-2002	14170.00
Tenth plan 2002-2007	27125.00

(Curtecy, K. Park)

Different types of family welfare programmes

1. RCH
2. MCH
3. National population policy
4. Universal immunization programme
5. Oral rehydration therapy.

Contribution of Government & Non-government Hospitals in Family Welfare Programmes

Contribution of Government Hospitals– Apart from PHCs, rural hospitals, taluka hospitals, district hospitals, specialist institutes & teaching institutes play a vital role in the family welfare programme.

Rural hospitals– Many rural dispensaries are upgraded to PHCs & PHCs are upgraded to rural hospitals. They cover the population of 5 lakh.

District hospital– District hospitals are proposed to be converted to district health centre. They act as curative, preventive & promotive centres. The staff includes doctors, compounders, nurses etc. along with paramedical workers.

CGHS– Central Govt. Health Scheme for central Govt. employees gives facilities like OPD care, drugs, laboratory, X-rays & other health services.

Defence medical services, Railway Hospitals, Health units & clinics also provide preventive, promotive & curative services.

Teaching institutes– Govt. medical colleges provide teaching facilities at under graduate & post graduate levels. They also act as the centres of excellency & provide superspeciality services also.

Contribution of Private Hospitals

Private practitioners give a large share of health services. The data in 1992 show the doctor patient ratio as 1:2100. The general practitioners comprise of 70% of total doctors.

Classification

1. Clinics– Constitutes of a doctor who manages preventive promotive & curative aspects of diseases.

2. Polyclinics– With number of specialists working under a single setup, provide multidesciplinary services.

3. Nursing homes– Small hospitals where the in patients are admitted & different speciality doctors treat accordingly.

4. Superspeciality hospitals– Bigger setups where all kinds of emergency facilities along with superspecialist team is available for the services.

5. Private medical colleges– They train the doctors & provide facility for the patients at reasonable price.

Voluntary Health Agencies

Voluntary health agency is defined as "an organization that is administered by an autonomous board, which holds meetings, collects funds for its support, mainly from private sources & expends money whether with or without paid worker in conducting a programme directed primarily to help the public health by providing health services or health education or by conducting research or legislation for health or by combination of these activities".

Functions

1. Helping in the work of Govt. agencies.
2. Explore the practicle ways for implementing their plan.
3. Health education
4. Practical demonstrations
5. They also guide & comment on the work of Govt. agencies
6. They seek the public opinion & advice the health legislation

Some important Voluntary Health Agencies in India

1. Indian Red cross Society
2. Hind Kusht Nivaran Sangh
3. Indian council for child welfare.
4. Tuberculosis Association of India.
5. Bharat Sevak Samaj.
6. Central social welfare board.
7. Kasturba memorial fund.
8. Family planning association of India.
9. All India women's conference.
10. The All India Blind Relief Society.
11. Professional Bodies.

Indian Red Cross Society

It began in 1920. They Participate in relief work during disasters like earth quake, bomb blast etc. Provide milk & medical supplies for hospitals, MCH etc. Primary function is taking care of wounded & sick soldiers in Armed forces. Red cross home at Bangalore is one of well equipped hospital.

Maternal & child welfare services are directly administered or supported by Indian red cress. Establishing blood banks & first aid training services are important works carried out by this organization.

Hind Kusht Nivaran Sangh

It came into existence in1950 with head quarters at Delhi.

Functions

- Financial assistance for leprosy homes, clinics, health education, posters, publications.
- Training of medical workers, physiotherapists.
- Conducting research, field investigation.
- Conducting all India leprosy workers conferences.
- Publication of a Quarterly journal of Leprosy in India.

Tuberculosis Association of India

It was started in 1939.

Functions

- Raises funds, trains doctors, health workers & social workers in antituberculosis work.
- Health education to facilitate early diagnosis and consultation.
- New Delhi Tuberculosis Centre.
- Lady Lilinthgow sanatorium at Kousali.
- King Edward VII sanatorium at Dharampur.
- Tuberculosis hospital at Mehrauli are some important centres which are managed by this association.

The prospective contribution of physicians, teachers & students

In India especially in rural areas a doctor can take in charge of a health centre immediately after graduation. He provides promotive, preventive, curative, rehabiliative & emergency services in the rural areas.

Care of the patient– The health status of a patient is assessed by a physician by interrogation, examination & investigation. Then necessary treatment is provided by him or in case of complication patient can be referred to higher centre.

Care of community– At PHC level he is the leader of the health team & participates in various activities.

Physician as teacher– Along with providing treatment, he has to educate the patient regarding prevention aspects.

Teachers

Teachers play vital role in training the medical & paramedical students efficiently. They act as the back bone of forth coming health system. They provide medical services along with training the students. During the time of emergency like earth quake, flood etc. they act as volunteer doctors, who serve at the site.

Students

They are the budding doctors. Proper & efficient training along with dedication and hard work make them good doctors in future. Again they assist the hospital staff during emergency situations like earth quake, flood, bomb blast etc.

Chapter- 20

NATIONAL PROGRAMMES

National Malaria Eradication Programme

National Malaria control programme began in 1953 April. To control Malaria DDT was sprayed inside houses (1 g/sq.m. area) twice in a year, where spleen rates were over 10%. As a result incidence reduced from 750 million cases in 1953 to 2 million cases in 1958. So programme was transformed to NMEP (National Malaria Eradication Programme). After initial success there was set back with increase in incidence from 50000 in 1961 to 6.4 million 1976. So modified plan of operation was framed in 1977.

Objectives

I. 1. To prevent mortality due to malaria

2. Reduce malaria morbidity

3. Intensive antimalarial measures in Agricultural & industrial area.

II. Reclassification of endemic area depending on, Annual parasite incidence.

III. API-2 & above for spray operation.

- 2 rounds of DDT, 3 rounds melathion & 2 rounds of pyrethroids at 6 week interval.
- Entomological assessment.
- Surveillance & treatment.

IV. Areas with API less than 2

- Focal spraying if P. falciform case detected
- Surveillance
- Treatment
- Follow up
- Epidemiological investigation

V. Drug distribution centre & fever Treatment depots.

Drug distribution centre	Fever Treatment depots
↓	↓
Only antimalarial tablets	Blood slides & antimalarial tablet.

There are 3.57 lakh centres in rural area.

VI. Urban malaria scheme

Vector control – Anti larval measures and drug treatment.

VII. P. falsiparum containment programme- It began in 1977 Octber with assistance of SIDA to prevent spread.

VIII. Research, chloroquine, alternative drug for resistent strains.

IX. Health education

X. Reorganization

District Health Officer (DHO) implements the NMEP. He is assisted by District Malaria Officer (DMO) at District Head quarter, DMO is assisted by Assistant Malaria Officer. In PHC Lab technicians, MO, MPW, HW & Surveillance inspector actively participate in the work.

Surveillence

- Active → Surveillance done by MPW workers.
- Passive → Search for malaria cases at PHC, sub centre etc.

Tools of malaria surviellance

Annual Parasite Incidence	– API
Annual Blood Examination Rate	– ABER
Annual Falciparum Incidence	– AFI
Slide Positivity Rate	– SPR
Slide Falsiparum Rate	– SFR

Role of Primary Health Care

1994 resurgence of malaria. Malaria action program MAP

- Prediction
- Ditection early
- Effective response
- Antimalaria month before onset of monsoon.

Urban area with SPR 50% or above come under urban malaria scheme.

National Filaria Control Programme

420 million people are exposed to risk of filariasis & 19 million are effected with disease and 25 million have parasites in the blood.

In 1978 the operational component was murged with urban malaria scheme. Training of Filariasis is under National Institute of Communicable Diseases Delhi, with Regional Centrel at Calicut (Kerala), Rajamundry (A.P.) Varana (U.P.)

Filaria control

- Vector control
- Treatment of microfilaria carriers

Vector control
- Anti adult → Spraying of DDT, malathion, fenitrothion
- Space application – Pesticide dispersion in air (pyrethrum)
- Antilarval measures – Oiling of collection of standing water or dust ing them with Paris green.
- Reduce mosquito breeding sites by filling of ditches, closing the reservoirs with coverings.

Chemotherapy– (i) Mass therapy DEC (Diethyl carbamazine). given to community irrespective of disease manifestations, in highly endemic areas.

(ii) Selective treatment– DEC is given only to microfilaria positive cases. Indian programme recommends 6 mg/Kg body weight of DEC for 12 days in period of two weeks. In endemic areas treatment is repeated once in 2 years.

(iii) DEC medicated salt– Usage of low doses of drug over long period. Common salt medicated with 1-4 g of DEC per Kg, treatment should be continued for 6-9 months.

Ivermectin a semisynthetic antibiotic 20-400 μg/Kg body weight in single dose was very effective. But by 3 months again nematodes appeared in blood.

NFCP is implemented through 206 filaria control units, 199 filaria clinics, 27 survey units primarily in endemic urban towns.

Revised filaria control plan

WHO recommends annual single dose mass drug therapy DEC with albendazole as suppliment in 30 highly endemic districts.

Kala Azar control programme

It began in the year 1990-91. It is a centrally sponsered programme. 33 districts of Bihar, 3 districts of Jarkhand, 10 districts of West Bengal, 2 districts of U.P. are endemic in *Kala azar*.

This has reduced the incidence & death rate of disease by 75% by the 2002.

Steps taken

1. Reducing vector i.e. sand fly by spraying DDT and sanitation
2. Early diagnosis & complete treatment.
3. Health education programme in the community.

Targets

1. Prevention of deaths due to Kala azar by 2004 with annual reduction atleast by 25%.
2. Zero level incidence by 2007.
3. Elimination of Kalaazar by 2010.

National Leprosy Eradication Programme

National leprosy control programme (NLCP) was started during 1955. It is a centrally sponsered programme to control leprosy. Slowly it progressed & in 1980 Govt. of India decided to eradicate leprosy by 2000.

In 1983 control programme was redeviced as National leprosy eradication programme, with the aim of reducing case load to 1 or less than 1 per 10,000 population.

Strategy

1. Early detection of cases through population & school survey, contact examination along with voluntary referal.
2. Short term multidrug therapy
3. Health education
4. Ulcer & deformity care
5. Rehabilitation activity.

To facilitate leprosy eradication programme following centres were started–

778 Leprosy control units or modified leprosy control units, 907 Urban Leprosy Centres (ULC), 5744 Survey, Education & Treatment centres (SET), 290 Temporary Hospitalization Wards (THW), 75 Reconstructive Surgery Units (RSU), 40 Sample Survey cum Assessment Unit (SSAU), 350 Mobile Leprosy Treatment Unit (MLTU).

Leprosy control units in endemic areas have one medical officer, 2 nonmedical supervisors, 20 paramedical workers. One unit covers 4.5 lakh population. SET centres comprise of 1 PMW (Para Medical Worker) for 15-20000 population, one non medical supervisor for 5 PMW. SET centres are attached to PHCs. One urban leprosy centre covers 50000 population. Mobile leprosy centres serve in non endemic areas, consists of 1 M.O., non M.O., non medical supervisor, 2 paramedical workers & a driver.

State leprosy officer is chief coordinator & technical advisor to concerned state. Central level leprosy division of Directorate General of Health services at New Delhi is responsible for planning, supervision & monitoring.

Modified leprosy elimination campaign

1. Organizing short term orientation training programme in leprosy, to health staff including medical officer, health workers & volunteers.

2. Increasing public awareness.

3. Door to door visit to detect new cases.

First round	–	– 4.3 lakh cases detected
Second round	– Jan-March 2000	– 2.13 lakh cases detected
Third round	– Oct 2001-Feb 2002	– 1.65 lakh cases detected
Fourth round	– Aug 2002-March 2003	– 1.04 lakh detected
Fifth round	– Dec 2003 - March 2004	– detected

In the Fourth campaign states were categorized.

Category I–Prevalence rate more than 5 per 10000 population

Category II– Moderate to low endemic areas training, voluntary reporting.

Category III– Very low endemic areas.

Fifth plan urban areas & rural areas are divided according to prevalence.

World Bank supported project on NLEP

I Phase → 3.8 million patients detected, cure rate with MDT was 4.4 million.

→ By March 2001 prevalence was reduced to 37/10,000

II Phase → New cases to be detected 11 lakh.

→ Leprosy cases tobe cured 11.51 lakh

→ Disability among new cases should be reduced to 2%.

Leprosy Elimination Monitoring (LEM)

It is necessary to assess the effects of NLEP services and facilitate the programme further.

National Tuberculosis Programme (NTP)

It was started during year 1962.

Objectives

(1) Long term– Reduce incidence of tuberculosis in the community, so that it is not a public health problem.

(2) Short term – to detect maximum tuberculosis cases.

– Vaccinate the new born & infant with BCG.

District Tuberculosis Programme (DTP)

DTP is back bone of NTP. Under this 600 TB clinics, of which 390 have been transformed into DTC to undertake T.B. control. National Tuberculosis Institute, Bangalore helps in implementation of NTP. General hospitals, community health centres, primary health centres, tuberculosis clinics, OPD of TB sanitarium & other health institutes also helps in the process. 17 TB training & demonstration centres are established.

DTC activities include case finding & treatment. Treatment is free & at OPD level. Dates will be fixed for collection of drugs once a month in the nearest centre. On failure to collect, after 7 days home visit is paid by health worker.

DTC Staff pattern →1 DTO (District Tuberculosis Officer)

1 MO (Medical Officer)

2 Laboratory technicians

2 Treatment organizer

1 X-ray technician

1 Non medical team leader

1 Statistical assistant

1 Pharmacist

Revised National Tuberculosis Control Programme began in 1993. By the end of 1998 only 2% of total population was covered by RNTCP under pilot phases I, II & III. Large scale implementation by 2004 resulted in coverage of May 851 million people over 466 districts & 76% of countries population were covered under this programme.

All patients are provided with free short term chemotherapy & during intensive phase of chemotherapy drugs are administered under Direct observed therapy short term (DOTS).

National Programme for Control of Blindness

It was started during the year 1976 with the central aid. Trachoma control programme was also merged with it.

Strategy

1. Improving the service delivery system.
2. Collecting resources for eye care.
3. Promoting activities & public awareness.
4. Improving developing institutions.
5. To establish eye care facility for every 5 lakh population.

Infrastructure	*Current achievements*
Strengthening of PHCs	5633
Central mobile units	80
Strengthening district hospital	445
Upgrading ophthalmology Dept. in medical colleges	82
Establishments of regional institutes	11
Ophthalmic assistant training centre	39
District mobile units	341
State ophthalmic cells	21
Establishment of DBCs	512
Govt Eye Banks	166
Paramedical ophthalmic assistants posted	4881

(Curtecy K. Park)

Administration

Central → Ophthalmology section.
Directorate General of Health Services.
Ministry of Health & Family Welfare New Delhi.

State → State ophthalmic cell.
Directorate of Health Services.
State Health Societies.

District → District Blindness Control Society.

Tertiary level → Regional institutes & centres of excellency in eye care medical colleges.

Secondary level → District hospitals & NGO Eye hospital.

Primary level → Subdistrict level hospitals, mobile ophthalmic units upgraded PHCs. Link workers/Panchayats.

1. School eye screening programme.

2. Collection & utilization of donated eyes. Eye donation fort night from 25th August-8th September is organized by voluntary organizations like Lions club, Rotary etc.

3. World bank assisted cataract blindness control project is functional since 1994-95 to 2002.

Danish assistance in 1998-2003 and also WHO assistance for prevention of blindness have been got.

Universal immunization programme

In 1974 expanded immunization programme was launched by WHO against diphtheria, pertusis, tetanus, polio, tuberculosis & measles in children.

In 1985 it was renamed as universal child immunization (UCI) with the goal of universal immunization by 1990. Govt. of India started EPI in 1978.

Objective

1. Reducing morbidity & mortality due to six preventable diseases of childhood.

2. Self sufficiency in production of vaccine. It was transformed into universal immunization programme in 1985.

Components– 1. Immunization of pregnant woman against tetanus.

2. Immunization of children in their first year of life.

Immunization services are done through health care delivery system like MCH, PHC, subcentres etc. There is no separate staff for immunization.

Significant achievements were made.

1985-1986 → 29% BCG & 41% DPT

By the end of 2002 – 82.9% of TT for pregnant, 81% of BCG, 70% DPT & 70% OPV.

There is percentage decline of polio myelitis to 99.05%, Diphtheria 61.75%, pertusis 82.36%, NNT (Neonatal Tetanus) 95.75%, & measles 81.70%.

Pulse polio programme was launched in 1995. Children under five years are given extra oral polio drops in December & January every year on fixed days.

Similarly **Urban measles campaign** was started in 1998. In 1999-2000, 50 cities were covered with aim of vaccinating children below 3 years with single dose of measles vaccine.

Neonatal tetanus elimination

This includes vaccinating all women in reproductive age group with 3 doses of T.T.

Integrated child development services (ICDS)

It was started in 1975 by Government of India in Ministry of Social & Women's Welfare. It has a package of early childhood services.

Objectives

1. To improve nutrition & health status of children in 0-6 years age group.

2. To lay proper foundation for psychological, physical & social development of the child.

3. To reduce mortality, morbidity, malnutrition & school drop outs among children.

4. To enhance capability of the mother & nutritional need of child through nutrition & health education.

Service package

Beneficiary	*Services*
Pregnant women	– Health check up.
	– Immunization against tetanus.
	– Supplementary nutrition
	– Nutrition & health education.

Nursing mothers	– Health check up – Supplementary nutrition – Nutrition & health education
Women 15-45 years	– Nutrition & health education
Children less than 3 years	– Supplementary nutrition – Immunization – Health check up – Referral services
Children in 3-6 yrs. age group	– Supplementary nutrition – Immunization – Health check up – Referral services – Non formal education.

Supplimentary nutrition

Under this programme supplementary nutrition is provided as follows.

(1) 200 Kcal energy & 8-10 g of protein to children below 1 year.

(2) 300 Kcal energy & 15 g of protein to children 1-6 year.

(3) 500 Kcal energy & 25 g of protein for pregnant & nursing mothers.

Immunization– Vaccination against 6 important infectious diseases is provided and TT for pregnant women.

Health check ups and non formal preschool education for children.

Reproductive & Child Health Programme

Reproductive & child health approach is defined as "people have the ability to reproduce & regulate their fertility. Women go through pregnancy & child birth safely, the out come of pregnancies is successful interms of maternal & infant survival & well being & couples are able to have sexual relations free from fear of pregnancy & contracting disease.

Components of RCH programme

1. Family planning
2. Child survival & safe mother hood.
3. Client approach towards health care.
4. Prevention & management of RTI, STD, AIDS.

Improvements under RCH programme

1. Upgradation of available facilities in providing intevention & quality care.

2. Improve the facilities of obstetric care MTP, IUCD insertion at PHCs & subcentres.

3. Specialist facilities for STDs, RTI at district & subdistrict level hospitals.

4. All interventions for fertility regulation, maternal & child health with reproductive health for men & women is provided under this programme.

5. Services is client oriented, demand driven & high quality.

RCH intervention at district level

1. Child survival measures like immunization, vitamin A, oral rehydration therapy, prevention of death due to pneumonia.

2. Safe mother hood measures are antenatal check ups, immunization for tetanus, safe delivery & anaemia control.

3. Establishment of RTI & STD clinics at district hospitals.

4. Adolescent health & reproductive hygiene are essential.

Essential obstetric care, 24 hour delivery services at PHC, CHCs, emergency obstetric care, MTP, prevention of RTI, STD, district surveys, immunization, oral rehydration therapy, Acute respiratory disease control and prevention & control of vitamin A deficiency in children are included under this programme.

New steps

1. Practical training of MBBS doctors in anaesthesia for emergency obstetric care at FRUS.

2. Practical training of MBBS doctors in the field of obstetrics.

3. Establishing blood banks at FRU.

4. Maternal benefit scheme (*Janani surakṣā yojanā*)

5. *Vande mātaram* scheme

6. Development of cadre of community level skilled birth attendants.

Measures for control of STD

1. Initial planning
2. Intervention strategy
3. Support components
4. Monitoring & evaluation.

(I) Initial planning

1. Problem definition
2. Establishing priority
3. Setting objectives
4. Considering strategies

(II) Intervention strategy

1. Case detection – Screening
   – Contact tracing
   – Cluster testing
2. Case holding & treatment.
3. Epidemiological treatment – contact treatment
4. Personal prophylaxis
   (1) Mechanical barriers – condoms
   – diaphragms.
   (2) Vaccines – Hepatitis B
5. Health education

(III) Support components

1. STD clinics.
2. Laboratory services
3. Primary health care
4. Information system
5. Legislation – The immoral traffic prevention act 1986.
6. Social welfare measures.

(IV) Monitoring & evaluation

Chapter- 21

MOTHER AND CHILD WELFARE PROGRAMME

In India, women of child bearing age (15-44 yrs) and children under 15 years constitute about 59% of total population. They are also vulnerable for diseases, so considered under special risk group. The sicknesses & deaths among the mother and child are preventable, so special emphasis should be given for improving the health of mothers and children.

Child and mother come under single unit because, there is constant association between foetus & pregnant lady through out pregnancy. Foetus depends on mother for nutrition during this period, so health of mother & foetus are interreleted and certian diseases can be transmitted from mother to child. Even after the birth upto 6 months, again infant is dependent on mother, as it is the period of breast feeding. Again here the health of mother has direct impact over the health of the child. Even after, mother is a person, who is constantly in touch with the child. She is the first teacher.

Mother and child health

The promotive, preventive, curative & rehabilitative health care for mothers & children is considered under mother & child health. Maternal health, child health, family planning, school health, handicapped children, adolescance etc are also considered under this.

Aims and objectives of MCH

(1) Reduction of maternal, perinatal, infant & childhood mortality and morbidity.

(2) Promotion of reproductive health

(3) Promotion of physical and psychological development of the child and adolescent in the family.

Aspects of the programme

(1) Maternal care (During pregnancy) → Antenatal care
→ Intranatal care
→ Post natal care

(2) Child care
- Infant
  - Neonatal care
  - Post neonatal care
- Care of pre school child.
- Care of school going child.

Maternal care

(1) Care during pregnancy

Primary aim of antenatal care is safe pregnancy, birth of healthy baby & healthy mother. Ideally the pregnant women should visit the antenatal clinic once in a month upto the first 7 months, twice a month during 8th month, and then once in a week till delivery, if everything is normal. But the poor community cannot afford this, so atleast 3 visits is required during the entire course of pregnancy.

1st visit – at 20 weeks

2nd visit – at 32 weeks

3rd visit – at 36 weeks.

During the antenatal checkups following examination are done.

First visit– General history, physical examination & investigation should be done. It includes urine analysis, stool examination, TC, DC, Hb%, blood grouping, Rh typing, VDRL & HIV.

Next visit– (1) Weight gain, blood pressure etc. should be examined.

(2) Iron & folic acid supplements along with calcium supplement is essential.

(3) Immunization against tetanus with two doses of tetanus toxoid injection 0.5 ml. IM, with a gap of one month is necessary.

(4) Nutritional advises & care about baby and warning aspects which need immediate doctor's advice are to be explained.

(5) Elderly primi (30 years & over), short statured primi, malpresentations, antepartum haemorrhages, pre-eclampsia, eclampsia, anaemia, twin pregnancy, hydrommions, previous still births, abortions, intrauterine deaths, elderly grand multipara, pregnancy associated with cardiovascular disease, Hypertension, Diabetes mellitus etc. are included under "high risk" cases, so special attention should be given in these conditions.

(6) Antenatal records should be maintained properly.

(7) Home visits are the pillars of MCH services, especially in the rural areas.

(8) Proper advice is essential for pregnant lady with respect to diet to prevent nutritional stress.

(9) Advice regarding personal hygiene is like personal cleanliness, rest & sleep in sufficient quantity, bowel movements, exercise, avoidance of smoking & intake of alcohol form another important aspect.

(10) Pregnant lady should be mentally prepared for giving birth to a child & councilling about wellbeing of child & infant care is another important component.

Proper Intranatal care

Delivery is a normal physiological process but complications may arise. Proper intranatal care is the most essential part, otherwise it may lead to complications like septicaemia.

Aims of good intranatal care

1. Delivery under proper aseptic measures.

2. Delivery with least injury to the infant & mother.

3. Complications such as prolonged labour, antepartum haemorrhage, convulsions, malpresentations and prolapse of the cord should be dealt with care.

4. Proper care of the baby at delivery like resuscitation, care of the cord, care of the eyes etc.

Intranatal care is of two types.

- Domiciliary care
- Institutional care

In the villages where hospital facility is not available, delivery is conducted at domiciliary level at home by health worker female or trained dai. This is known as **domiciliary midwifery service.**

Merits

1. The mother delivers in familiar surroundings without any fear of hospital.

2. Chances of nosocomial infections are less.

3. Mother is able to look after the infant and household work simultaneously.

Demerits

1. Delivery is conducted only under supervision of trained dai but not doctor.

2. As mother does the house hold work, she can not take rest properly.

3. In case of complications during delivery, immediate medical care is not available.

Referal to institution

In case of sluggish pain or rupture of membrane without pain, prolapse of cord, meconeum stains, very slow or excessively fast foetal heart rate, retention of placenta, or post partum haemorrhage, patient should be immediately refered.

Hospital care

In the cities most of the time the institutional deliveries are conducted. They are prefered for the following reasons.

1. Immediate medical care is possible in case of emergency or complication.

2. Expert doctors and nurses are available all the time.

Disadvantages

1. Surroundings are not familiar to the lady.

2. Chances of cross infection is more.

Proper Post natal care

Care of mother after parturation is known as post natal or post partal care. This can be broadly divided into care of mother & care of new born. The combined area of responsibility is known as **perinatology**.

This includes prevention of complications, proper care for rapid restoration of mother's health, to check the state of breast feeding, to give family planning services & to give health education.

The complications during post natal period like puerpural sepsis, thrombo phlebitis, secondary haemorrhage and urinary tract infection should be handled with care.

The mother should have optimum health. So physical examination should be done properly, Anaemia should be treated by iron & folic acid supplement. If necessary calcium supplement should also be given. The mother should take adequate quantity of balanced diet. The post natal exercises to strengthen the perineal muscles as well as abdominal muscles in required amount is adviced.

Breast feeding is the most essential factor. Immediately after the birth of the new born, breast feeding is suggested. Infant is dependent completely on breast milk upto 4-6 months. Later supplementary foods are necessary for the proper growth of the child.

Family planning is most essential. Because it will be a burden for the mother, if she concieves with in the first year.

Family Planning

Family planning by WHO as "a way of thinking & living, that is adopted voluntarily, upon the basis of knowledge, attitude & responsible decisions by individuals & couples in order to promote the health & welfare of the family group & thus contribute effectively to the social development of a country".

Objectives

1. To avoid unwanted births
2. To bring about wanted births
3. To regulate interval between pregnancies
4. To control the time at which birth occurs in relation to ages of the parent.
5. To determine number of children in the family.

Contraceptive Methods

I. Spacing methods → Barrier methods
- Physical
- Chemical
- Combined

→ Intra uterine contraceptive Device (IUCD)
- I generation
- II generation
- III generation

→ Hormonal methods
- Oral pills
- Depots (slow release form)
- Injectables
- Subcutaneous implants
- Vaginal rings

→ Post conceptional methods

→ Other methods.

II. Terminal methods → male sterilization → vasectomy
Female sterilization → Tubectomy
→ Laperoscopy.

Spacing Methods

Barrier method

Physical barrier
- Condoms → males
- Diaphragm → female
- Vaginal sponge → female

Condoms are most commonly known & used physical barrier device by males. In India it is well known by name *NIRODH*.

Mode of use

- It is fitted on the erect penis before intercourse. The air must be expelled from the teat end to create space for ejaculate.
- It should be held carefully while withdrawing penis from vagina.
- A new condom should be used for each sexual act.

Merits

- Easily available, safe & cheap.
- No need of medical supervision.
- Devoid of side effects.
- Provides protection against sexually transmitted diseases.
- They are light, compact & disposable.

Demerits

- It may slip off or tear during coitus due to improper use.
- It interferes with sexual sensation.

Other methods like Diaphragm is not much in practice due to many disadvantages.

Chemical methods

Foams, cream, jellies, pastes, suppositories & soluble films are also used.

Mode of action

Spermicides → surface-active agents which attach themselves to spermatozoa, inhibit oxygen uptake & kill sperms.

Disadvantages

- There is very high failure rate.
- Application should be almost immediately before intercourse & repeated before each sexual act.
- All regions of vagina where sperms can to be deposited should be smeared with chemical.
- Mild burning or irritation, systemic toxicity are adverse effects.
- They cause messiness
- They may cause systemic toxicity
- Inflammatory or carcinogenic action on vaginal skin or cervix can also occur.

Intra Uterine Contraceptive Device IUCD/IUD

Non-medicated → I generation IUD.

Medicated → II generation → copper IUD

→ III generation → hormone releasing IUD.

I generation IUD

Made of inert polythene, nontoxic, non tissue reactive material, commonest was Lippe's loop. It is **out dated** because of its side effects like pain, bleeding & chances of perforation of uterus.

II generation IUD

New approach of adding copper was started in 1970. It is having 'T' shape, releases copper ions which are having spermicidal effect.

Mode of Action

1. IUDS cause foreign body reaction in the uterus causing cellular & biochemical changes in endometrium & uterine fluids.
2. Impare viability of gametes.
3. Reduces chance of fertilization rather than its implantation.
4. By altering biochemical composition of cervical mucous.
5. Copper ions affect sperm motility, capacitation & survival.
6. Copper ions have strong antifertility effect.

Merits

1. Insertion is simple which does not require complex procedures or hospitalization.
2. Insertion is done quickly.

3. Once inserted stays in place as long as required.
4. Cheap.
5. Contraceptive effect is reversible by removal of IUD.
6. Almost free from systemic & metabolic side effects as in hormonal pills.
7. Highest continuation rate is observed.

Demerits

1. Heavy menstruation or pain may be experienced.

Indications

1. Who has given birth to atleast one child.
2. No history of pelvic inflammatory disease.
3. Should have normal menstrual period.
4. Should be ready to check the tail of IUD.
5. Monogamous relationship.

Contraindications

1. Suspected pregnancy.
2. Pelvic inflammatary diseases (PID).
3. Vaginal bleeding of undiagnosed aetiology.
4. Cancer of cervix/adnexa/pelvic tumours.
5. History of ectopic pregnancy.
6. Anaemia
7. Previous history of PID.
8. Purulent cervical discharge.
9. Distortion of uterine cavity due to congenital malformations or fibroids.
10. Unmotivated person.

Time of insertion

8-10 days after menstruation.

6-8 weeks after delivery.

Side effects & complications

1. Excessive Bleeding.
2. Pain.
3. Pelvic infection.
4. Perforation of uterus.

5. 3-5% chances of pregnancy.
6. 3-5% of Ectopic pregnancy of all pregnancy.
7. 4-30% chance expulsion.

III generation IUD (Hormone releasing devices)

Based on the principle of release of hormone, most commonly used device is **Progestacert**, the hormone is released slowly in the uterus at the rate of 65 mcg daily. IUD releasing 20 mcg of levonorgestrel is also found.

Advantages– Lower menstrual blood loss & fewer days of bleeding compared to copper T devices.

Disadvantages– Costly.

Mode of Action

1. Increase viscosity of cervical mucous, there by prevent sperm from entering cervix.
2. High levels of progesterone in endometrium & relatively low levels of oestrogen make endometrium unfavourable for implantation.

Hormonal contraceptives

When properly used they are the most effective spacing methods of contraception.

Classification

I. Oral pills
   Progestogen only pill.
   Combined pill → 30-35 mcg synthetic oestrogen, post coital pill 0.5-1 mg progestogen.
   Once a month (long acting) pill
   Male pill.

II. Depots (slow release formulations)
   Injectables
   Subcutaneous implants
   Vaginal rings

- Most commonly used are combined pills, with 30-35 mcg of oestrogen & 0.5-1 mg of progestogen.
- Pills are given orally for 21 days daily, beginning on 5th day of menstrual cycle, followed by break of 7 days, during which bleeding occurs & known as "**withdrawal bleeding**".

- Pills should be taken every day at a fixed time, preferably before bed.
- If one forgets, then taken as soon as one remembers, then the regular dose.

Mala-D & Mala-N. are available free of cost in Govt. hospitals. They contain– Norgestrol– 0.3 mg, Ethinil oestradiol– 0.03 mg.

Contain 28 tablets, 7 brown film coated ferous fumarate tablets.

Advantages

1. Regulates the irregular menstruation
2. Reduces bleeding
3. Protection against 6 diseases. Benign breast disorders including fibrocystic disease & fibroadenoma, ovarian cysts, iron deficiency anaemia, PID, ectopic pregnancy & ovarian cancer.

Side effects

(1) Cardiovascular effects– 40% higher death rate in women using pills due to myocardial infarction, cerebral thrombosis, venous thrombosis with or without pulmonary thrombosis.

(2) Carcinogenosis– Increased cervical carcinoma.

(3) Metabolic effect.

Elevation of blood pressure, alteration in serum lipids, decrease in high density lipoprotein, blood clotting, increase in blood glucose & plasma insulin.

Others

Liver → It may lead to hepatocellular adenoma & gall bladder disease.

Lactation → It effects quantity & constituents of breast milk.

Subsequent fertility → Slight delay in conception.

- Breast tenderness
- Weight gain
- Headache & migraine
- Bleeding disturbances

Mode of action

Prevent release of ovum from ovary, achieved by blocking pituitary secretion of gonadotropin.

Depot formulations are not commonly used in India, because of their adverse effects & high cost.

Post conceptional methods

- Menstrual regulation

Aspiration of uterine contents 6-14 days after missed period.

- Abortion

Other methods

- Abstinence
- Coitus interruptus
- Safe period
- Natural family planning method
- Breast feeding
- Birth control vaccine.

But these methods are not reliable.

Terminal Methods

Male sterilization/vasectomy

Vasectomy is a simple procedure, which can be performed even at primary health centre, by trained doctors under local anaesthesia with strict aseptic precautions. Here a piece of vas at 1 cm is cut after clamping, the ends are ligated & then folded back on themselves & sutured in position, so that cut ends face away from each other. Which will reduce the risk of recanalization. Person turns sterile after 30 ejaculations.

Tubectomy– Here the fallopian tubes are closed to prevent the release of egg into uterine cavity. The tubes are closed with bands, clips or cutting & tying. The operation is performed under local anaesthesia in minilaparotomy or through laparoscope.

According to the choice of couple, different family planning measures can be adopted.

Mother should be educated regarding hygiene, feeding infant, spacing of pregnancy, importance of health check up, importance of immunization & birth registration.

Appropriate Care for Children

The children belonging to 0-14 years are included here. They constitute 40% of total population. Children can be divided into three groups depending on age.

1. Infants (upto 1 year of age).

(a) Neonatal (first 28 days after birth).

(b) Post neonatal (28^{th} day to 1 year).

2. Preschool children (1-4 years).
3. School going children (5-14 years).

Proper Neonatal care

Early neonatal care includes establishment and maintenance of cardiorespiratory functions, maintenance of body-temperature, avoidance of infection, establishment of satisfactory feeding regimen, early detection & treatment of congenital anomalies or acquired infection.

Immediate care after birth

1. Cleaning of airways
2. APGARS score analysis
3. Care of the umbilical cord.
4. Care of the eyes
5. Care of the skin
6. Maintenance of body temperature
7. Breast feeding

1. Cleaning the air way

It is essential for establishment and maintenance of cardio respiratory functions. The airways are cleared off mucous & other secretions. Gentle suction should be done to remove mucus & amniotic fluid. Resuscitation will be essential if natural breathing does not establish with in one minute.

2. Apgars score

	Score		
Sign	*0*	*1*	*2*
Heart rate	Absent	Slow below 100	Over 100
Respiratory effort	Absent	Slow irregular	Good crying
Muscle tone	flaccid	So flexion of extremities	Active movements.
		Reflex response	No response
Grimace	Cry		
Colour	Blue, pale	Baby pink blue extremity	Completely pink
Total score 10	Severe depression 0-3	Mild depression 4-7	No depression 7-10

(Curtecy SPM. K. Park.)

Care of the umbilical cord

The cord should be cut and tied after stopping of pulsation. Instruments should be sterilized properly to prevent tetanus. It dries up and separates by aseptic necrosis with in 5-8 days.

Care of eyes

The lid margins of new born should be cleaned with sterile cotton. A drop of freshly prepared silver nitrate solution (1%) should be put into eyes to prevent gonococcal conjunctivitis.

Care of skin

The baby should be given bath with soap & warm water to remove vernix, maconium & blood clots. According to *Āyurveda* massage with *Kṣīrabala taila* is ideal.

Maintenance of body temperature is also most essential. In case of premature births baby can be kept in incubator to maintain the temperature.

Breast feeding

Breast feeding establishes mother child relationship known as bonding. The first milk which is called **colostrum,** is the most suitable food for baby. It is rich in immunoglobulins which provide immunity.

Examination of neonate

Detailed neonatal examination is very essential to detect birth injuries, congenital anamalies & assess maturity. Different reflexes should be elicited to assess the maturity. Body weight, length, head and chest circumference should be noted. Babies with low birth weight, preterm babies & small for date babies should be treated with care.

Care of at risk infants

Birth weight less than 2.5 kg., twins, birth order 5 and more, artificial feeding, weight below 70% of expected weight, failure to gain weight during three successive months, children with PEM, diarrhoea & working mother/single parent are considered as at risk infants.

Feeding of infants

(1) Breast milk is the ideal food for the infant. The mother should feed the baby according to baby's needs, varying from 1 to 4 hours.

Merits

1. It is safe, clean, cheap & available at desired temperature.
2. It gives all nutrients required for infant upto first few months.
3. Rich in immunoglobulins, lysozome, lactoferrin etc.
4. Easily digested.
5. Promotes bonding between mother & infant.

Artificial feeding in some conditions

In conditions of insufficient breast milk, prolonged illness or death of mother, artificial feedings in the form of dried milk powder, cows milk or commercial formulae can be used.

Weaning

Gradual with drawal of child from breast feeding is known as weaning. It is a gradual process starting around the age of 4-5 months, as mother's milk alone is not sufficient for the needs of growing infant.

It is supplemented by suitable foods rich in proteins and other nutrients which are known as "supplementary foods". These are usually cow's milk, fruit juice, soft cooked rice, dhal & vegetables. After one year solid foods comprising of curds, pulses, vegetables, & fruits can be given.

Growth monitoring

Growth & development is dependent on many factors like genetic inheritance, nutrition, age, sex, physical surroundings, psychological factors, infections & parasitosis, economic factors etc.

Parameters for growth monitoring are mainly height, weight, head & chest circumferences. For growth monitoring growth charts or **road-to-health chart** is a visual means used to indicate childs physical growth & development. Mental development is assessed by means of mile stones.

Measures of disease prevention

1. In mother to prevent nutritional diseases, supplements of iron & folic acid are given during pregnancy & lactation.

2. Immunization with tetanus toxoid 2 doses, with a gap of 1 month for pregnant lady is essential.

3. Proper aseptic measures during the time of delivery, along with adequate medical facilities prevent complications during labour.

4. Genetic councilling prevents many of congenital anamalies.

5. Avoidance of consanguineous marriages leads to prevention of many hereditary disorders.

6. Breast feeding & proper supplementary food at proper age can prevent nutritional deficiency disorders in children.

7. Maintenance of hygiene can prevent many infectious disorders like diarrhoea & dysentry among children.

8. Immunization of children also can prevent certain grave infectious diseases.

9. Proper monitoring of the children can prevent many complications as a vigilent mother takes the child to a doctor at an early stage of disease.

10. In conditions of physical or mental handicap, early diagnosis helps to a great extent by the help of occupational therapy schools.

Vaccination

Vaccine is an immunobiologial substance designed to produce specific protection against a given disease. It stimulates the production of protective antibody and other mechanisms.

Vaccination is the process adopted to get specific immunity against a specific disease by means of a vaccine.

Vaccines are available against diseases like chicken pox, cholera, diphtheria, Hepatitis A, Hepatitis B, Influenza, measles, meningitis, mumps, pertusis, plague, polio, rabies, rubella, tetanus, tuberculosis, typhoid, yellow fever.

National immunization schedule

For infants–

At birth	–	BCG & OPV-0 dose
At 6 weeks	–	BCG (if not given at birth)
	–	DPT-1 & OPV-1
At 10 weeks	–	DPT-2 & OPV-2
At 14 weeks	–	DPT-3 & OPV-3
At 9 months	–	Measles

At 16-24 months – DPT & OPV.

At 5-6 years – DT (Second dose with a gap of 1 month if there is no clear history of DPT vaccination.)

At 10 & 16 years – Tetanus toxoid (Second dose of T.T. with a gap of one month if not immunized earlier with DPT, DT or TT vaccines).

For pregnant–

Early pregnancy TT-1 or booster. One month after TT-2.

Various programmes for mother & child welfare

Various social welfare programmes for women & children can be broadly categorized into

1. Programmes for welfare of women
2. Programmes for welfare of children
3. Combined programme for both women & children.

Child welfare agencies

(1) Indian council for child welfare (ICCW)

(2) Central social welfare board.

(3) Kasturba Gandhi Memorial Trust.

(4) Indian Red Cross Society.

International agencies

UNICEF, WHO, International union for child welfare, CARE, FAO of the united nations.

Combined programme

1. ICDS
2. RCH
3. Special nutrition programme
4. Prophylaxis against nutritional Anaemia
5. Universal immunization programme

For children

1. Vitamin A prophylaxis programme
2. Balwadi nutrition programme.
3. Midday meal programme

These programmes have been described in detail under the chapter of *Quantity of food and nutrition* & national programmes.

Chapter- 22

WORLD HEALTH ORGANIZATION

It is a specialized, non political health agency of 'United Nations' with head quarters at Geneva.

Brief history

- During conference held at San Francisco WHO took its origin in April 1945.
- Constitution was drawn in International health conference at New York in 1946.
- Formal existence of WHO began on 7th April 1948.
- Every year 7th April is celebrated as World Health Day.

Objectives

- The attainment by all people of the highest level of health.
- Health for all by 2000 A.D.

Preamble of constitution states

1. Health is a state of complete physical, mental & social well being & not merely the absence of disease or infirmity.

2. Enjoyment of highest attainable standard of health by all without differentiation of race, religion, political belief, economic & social condition.

3. Health promotion & protection by state.

4. Healthy development of child is of basic importance.

5. Informed opinion & active co-operation on the part of the public care is most important in improvement health of people.

6. Govt. have responsibilies for health of their people.

Two Important Health Policies

1. Alma Atta conference in 1978 on Primary Health Care.

2. Global stratagy for Health for all by 2000.

Both WHO & UNICEF are striving towards the goal.

Eligibility for Membership

- Open to all countries.

- In 1996 WHO had 190 member states & 2 associate members.

Functions of WHO

1. Act as directing co-ordinating authority on all International health works.

2. Permits WHO member states to identify collectively priority of health problems through out the world.

3. Define collectively health policy & targets to cope with them.

4. Device strategies, principles, & programmes.

5. For establishing, promoting international standards in the field of health.

Broad areas

1. Prevention & control of specific diseases.

2. Development of comprehensive health services throughout the world.

3. Family health improvement.

4. Environmental health monitoring & protection.

5. Regular updating of Health statistics.

6. Support to biomedical research.

7. Publication of health literature & information.

8. Co-operation with other agencies.

Structure of WHO

Principle organs–

1. World Health Assembly

2. Executive board

3. The secretariat

Curtecy K. Park.

Regions		*Regional head quarters*
South East Asia	–	New Delhi (India)
Africa	–	Harare (Zimbabwe)
America	–	Washington DC (USA)
Europe	–	Compenham (Denmark)
Eastern Meditarranian	–	Alexandria (Egypt)
Western Paciphic	–	Manila (Philippines)
Main head quarter	–	Geneva

The World Health Assembly

It is the health parliament & supreme governing body, annually meets in May at Geneva.

Functions

1. To determine international health policy & programme.
2. To review work of past year.
3. To approve budget needed for the following year.
4. To elect member states to designate a person to serve for executive boards & to replace retiring members.

The executive board

Initially 18 members were present. They are designated by member states & presently 30-31 members are present. Members are "technically qualified in the field of health". They are designated by Government, but do not represent Government.

1/3 rd of members are replaced each year. Meeting is held twice in a year. Effects decision & policies of assembly. It has power to take measures during emergency like epidemics, earth quakes, flood etc.

The secretariat

Director general is the head & chief technical & administrative officer of WHO at Geneva.

Function

Provide member states with technical & managerial assistance for their national health development programmes. 5 assistant director generals are present to help. It has 14 divisions.

Alma Atta Dellaration

In 1978 International conference was held at Alma Atta (USSR).

A new approach to health care came into existance as a part of movement set by world health assembly in 1977 ie **health for all by 2000.**

Fundamental principle of HFA strategy is equality, that is equal health status for people & countries with an equitable distribution of health resources.

Alma Atta conference brought the **concept of 'primary health care'**, especially to vast majority of rural people & urban poor with out health care facility.

It called all Governments to make national policies, stratagies & plans of action to implement & sustain primary health care as an integral part of national health system.

Role of Indian System of Medicine in National Health Policy

Minister of Health & Family welfare

↓

Secretary

↓

Director of Health Services

↓ Director of medical education

↓ Director of *Āyurvedic* education

↓ Deputy director of *Āyurveda*

- ↓ Principals of *Āyurvedic* College (Govt.)
- ↓ Principals of Ayurveda Colleges (Private)
- ↓ Zonal officer
- ↓ District (chief Medical officer)
  - Subdivisional Medical Officer
    - ↓ Physician (Homeopathy)
    - ↓ Physician (Ayurveda)

- Normal functioning
- Function During Emergencies

- Govt sector
- Private sector

Indian system of medicine plays pivotal role in the health care system of India. In the government sector various Ayurvedic colleges, hospitals and dispensaries serve the public, act as important organ in primary health care and implementation of National programmes, both at rural as well as urban levels. Private Ayurvedic colleges and practitioners along with hospitals are also part of health care system.

Chapter- 23

HEALTH ADMINISTRATION

India is country comprising of 28 states & 7 union territories. The states are independent in matter of health care delivery system. Each state has developed its own system of health care delivery. Central Government has the responsibility of policy making, planning, guiding, assisting, evaluating, & co-ordinating the work of the state Health ministries. Health system in India has 3 main links like central, state & local or peripheral.

Nature of Health & Treatment Department at the National Level

I. At the centre level

Organs of health system–

1. The Ministry of Health & Family Welfare.
2. The Directorate General of Health Services.
3. The Central council of Health & Family Welfare

1. Union Ministry of Health & Family Welfare

Organization

Headed by → Cabinet Minister

Minister of State

↓

Deputy Health Minister.

Department

Department of Health	Department of family welfare
Executive head - secretary	Secretary to GOI
↓	↓
Assisted by Joint secretaries	Assisted by Additional secretaries & commissioner
↓	↓
Deputy secretaries	
↓	
Administrative staff	Joint secretary

Functions

Mainly 2 — Union list
— Concurrent list

Union list

1. International health relation & vigilance of port quarantine.
2. Administration of central institutes.
3. Promotion of research.
4. Regulation & development of medical, pharmaceutical, dental & nursing profession.
5. Establishment & maintenance of drug standards.
6. Census, data collection & publication.
7. Regulation of labour in mines & oil fields.
8. Coordination with matters of state.

Concurrent list

1. Prevention of communicable diseases.
2. Prevention of adulteration of food.
3. Control of drugs & poisons.
4. Vital statistics,
5. Labour welfare.
6. Economic & social planning.
7. Population control & family planning.

2. Directorate general of health services organization

Director general of health services
↓
Additional director general of health services
↓
Team of deputies
↓
Administrative staff

Functions

Mainly two — General– Surveys, planning, co-ordination & programming of all health matter.
— Specific — International health relations & quarantine

Medical research — Control of drug standards
Central Govt. Health Scheme — Medical store depots
National programmes — Post graduate training
National medical library — Medical education

Central council of Health

Union health minister is the chairman & state health ministers are the members.

Functions

1. To consider & recommend broad outlines of policy with respect to matters of health.

2. To make proposals for legistation in the fields of medical & public health matters.

3. To make recommendations to Central Government, regarding distribution of available grants in aids for health purpose & to review periodically.

4. To establish organizations for promoting & maintaining co-operation between Central & State administrations.

II. At the state level

Sector comprises of state health ministry & state health directorate.

1. State Health Ministry

Minister of Health & Family Welfare.
↓
Deputy Minister of Health & Family Welfare
↓
Health secretarial official organ ⟶ [Health secretary
↓
Deputy secretaries
↓
Under secretaries
↓
Administrative staff.]

2. State Health Directorate

Director of Health Services
↓
Deputy directors
↓
Assistant directors

Regional	Functional
Inspect all branches irrespective of their speciality	Specialists in particular branch of public health

Functions

1. Organization & direction of all health activities
2. Inspect the medical colleges.
3. Implementation of health plan.
4. Health services & training of staff.

III. At the District level

The district is under the administration of collector. It is sub divided into six administrative areas, like subdivisions, *Tehsils* (*Tālukas*), community development blocks, muncipalities & corporations, villages & *Pancāyats*.

Administrative block	Population covered	Administrator
Sub divisions	Two or more subdivisions	Assistant collector.
Tehsils (Taluka)	200-600 villages	Tehsildar
Community development block	Approximately 100 villages 80,000 to 1,20,000 population	Block development officer.
Municipalities	Population ranges from 10,000 to 2 lakh	Chairman or president
Corporations	Populations above 2 lakhs	Mayors

Pañcāyati Rāj

It is a three tier structure of rural local self government in India. Linking the village to the district.

1. *Panchayat*– at the village level.
2. *Panchayat samithi*– at the block level
3. *Zila parishad*– at the district level.

1. At village level– 5000 to 15000 populations is covered.

Pañcāyat rāj

- Grāma sabhā
  - Assembly of adult
  - Meets twice a year
  - Concerned with taxation
  - Annual programme
  - Electing the members
- Grām Pañcāyat
  - **Executive organ of Grāma sabhā**
  - Members 15-30
  - Period 3-4 years.
  - Head (Sarpañca/Mukhiyā) ↓ Vice president ↓ Secretary
  - Function– Planning & development at village level, sanitation, public health.
- Nyāya Pañcāyat

2. At Block level

Population of about 80,000 to 1,20,000 is covered. Pañcāyat samiti/Janapada pañcāyat is the functioning body.

Block Development Officer (BDO) is officer secretary, Sarpañcs of village pañcāyats, MLAs, MPs residing in the area, representatives etc. together with BDO take part actively in planning & development of villages.

3. At District level

Zila pariṣad/Zila pañcāyat is the functioning body.

Members include the heads of Pañcāyat samitis, MLAs & MPs of the district, representatives of women, SC, ST etc. & collector is non voting member.

●

Chapter- 24

HEALTH RELATED STATISTICS

Statistics is systematic collection of numerical information. It is the science of collecting, classifying, presenting & interpreting data relating to any sphere of enquiry.

It is helpful to measure the health to conduct research studies, to conduct controlled clinical trials, to conduct epidemiological studies, to plan health programmes, to see the met & unmet needs of community, to collection & computation of vital rates like birth, death, infant mortality rates and to know the morbidity levels in the form of incidence & prevalence rates.

Methods of collection of Data

The data for any study can be collected directly from the source of information by investigator himself or collected by some one else for yet another study. Data collected should be accurate, valid, precise & reliable.

Primary data

This can be collected by various methods.

1. Direct personal observation– It is the most accurate method where investigator himself collects the data. But in large studies it is not possible.

2. By sending enumerator– Data is collected by a person trained by investigator. Proper supervision and training gives fairly precise data.

3. Postal questionnaire method– Here the questionnaire is sent by post, but there is chance of reply by only interested parties. So results may be biased.

Secondary data

The data collected by one person or agency is utilized by another person or agency for yet another study.

Sources of statistics

1. Census conducted by Government agency
2. Registration of vital events
3. Sample registration scheme
4. Notifiable disease statistics.
5. Hospital records
6. Epidemiological surveys
7. Research findings

Vital statistics is defined as "collection by Government agencies of data relating to vital events such as births, deaths, marriages, divorces & health & disease related states & events which should be reportable by local health authority".

Aims & objectives

- Population estimation & forecasting.
- Analysis of health trends.
- Programme planning, monitoring & evaluation.
- Operational & Administrative decisions.
- Providing measures for health & disease of community.

Instrument for measurements

- Rates
- Ratios
- Proportions

$$\text{Rates} = \frac{\text{How many at specific time}}{\text{Out of how many at same time}} \times 1000$$

- Crude rates
- Specific rates
- Standardized rates → Direct / → Indirect
- Other rates
  - Quinquinial rates
  - Decennial rates
  - Weekly rates

Ratio

Relation between 2 unrelated quantities ie the numerator is not contained in denominator, such as number of female population per 1000 males.

Dependency ratio

$$= \frac{\text{Population aged 0-14 yr + population 65 yr \& above}}{\text{Population aged 15-64 yr}} \times 100$$

In India child dependency – 57.8% Old age dependency 76%

Total dependency – 65.5%

Proportion

Numerator is mandatarily included in denominator, Proportional mortality due to AIDS.

$$= \frac{\text{No of death due to AIDS}}{\text{No of death due to All cases}} \times 100$$

Numerator includes number of occurence of any event at a particular time in a specified region. The denominator may be either related to the population or total number of a particular event.

Related to population denominator consists of mid year population or population at risk or person time or person distance or subgroups of population. Related to total events Births, deaths, accidents etc. are included.

Mortality measurements

- It is more important, because it is the only data that is available in many countries.
- Easy to collect
- Reasonably accurate
- Beginning point for many public health study.

Demerits

- Death may not be reported
- Cause of death & age of deceased may not be accurate
- Lack of uniform & standardized methods of collection of data
- If single cause of death is recorded, other associated conditions & risk factors may not be available.
- Coding systems & diagnosing practices may change over time, affecting validity of data.
- It is almost useless in case of mental illness.

Mortality rates & ratios

1. Crude death rate (CDR)

"The number of deaths occuring due to all causes per 1000 estimated midyear population in the given year in a given place".

$$\text{CDR} = \frac{\text{Number of deaths during the year in a place}}{\text{Total mid year population of the same place \& year}} \times 1000$$

2. Specific death rates

- Cause or disease specific
- Specific groups – sex, age, income etc.

(a) Specific death rate due to AIDS =

$$\frac{\text{No. of deaths from AIDS during an year}}{\text{Mid year population}} \times 1000$$

(b) Specific death rate for females =

$$\frac{\text{No. of deaths among females during an year}}{\text{Mid year population of females}} \times 1000$$

(c) Specific death rate in age group 15-49 yr =

$$\frac{\text{No. of deaths of persons aged 15-49 during an year}}{\text{Mid year population of persons aged 15-49}} \times 1000$$

3. Case fatality ratio

$$= \frac{\text{Total number of deaths due to a particular disease}}{\text{Total number of cases of same disease}} \times 100$$

4. Proportional mortality ratio

(a) Proportional mortality from a specific disease =

$$\frac{\text{No. of deaths from the specific disease in a year}}{\text{Total deaths from all causes in the same year}} \times 100$$

(b) Under 5 proportional mortality rate =

$$\frac{\text{No. of deaths under 5 yr of age in a year}}{\text{Total number of deaths during same year}} \times 100$$

(c) Proportional mortality rate for aged 70 yr. & above =

$$\frac{\text{No. of deaths of persons aged 70 yr \& above}}{\text{Total deaths in the same year}} \times 100$$

5. Survival rate

$$= \frac{\text{Total number of patients alive after 5 yr.}}{\text{Total number of patients diagnosed \& treated}} \times 100$$

Disease like cancer AIDS etc.

Indicators of MCH care

Maternal & child health can be measured by indicators, which represent the health status of community.

1. Maternal mortality rate MMR
2. Perinatal mortality rate
3. Neonatal mortality rate
4. Infant mortality rate
5. 1-4 yr mortality rate
6. Under 5 mortality rate
7. Child survival rate.

1. Maternal Mortality Rate (MMR)

WHO definition of MMR- "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration & site of pregnancy, from any cause related to or aggravated by pregnancy or its management but not from accidental or incidental causes".

$$= \frac{\text{Total no. of female death occuring due to pregnancy, puerperal causes in an area during given period}}{\text{Total no. of live births in same area \& year}} \times 1000$$

2. Still Birth Rate (SBR)

It is the ratio of number of death of foetus weighing 1000 gm or more occuring during one year to the total live births & still births over 1000g in a year, per 1000."

$$\text{SBR} = \frac{\text{Foetal deaths weighing over 1000g at birth}}{\text{Total live + still births weighing over 1000 gm at birth}} \times 1000$$

3. Perinatal Mortality Rate (PNMR)

Perinatal term refers to both late fetal deaths or still births & early neonatal deaths. According to International Classification of Diseases ICD includes period from 28 weeks of pregnancy to one week after birth.

According to WHO

Late foetal deaths (28 weeks of gestation & more) + early neonatal deaths (first week)

$$\text{PMR} = \frac{\text{in one year}}{\text{Live births in the same year}} \times 1000$$

4. Neonatal Mortality Rate (NMR)

Ratio of number of neonatal deaths in a given year to total number of live births in the same year is neonatal mortality rate, expressed as rate per 1000.

$$\text{NMR} = \frac{\text{Number of deaths of infants under the age of 28 days in a year}}{\text{Total live births in the same year}} \times 1000$$

5. Post-neonatal Mortality Rate (PNMR)

It is defined as "the number of post neonatal deaths in a given year to thousand live births in the same year".

$$\text{PNMR} = \frac{\text{Number of deaths of infants between 28 days \& one year of age in given year}}{\text{Total live births in the same year}} \times 1000$$

6. Infant Mortality Rate (IMR)

It is defined as "the number of infant deaths registered in a given year per thousand live births in the same year"

$$\text{IMR} = \frac{\text{Number of deaths of children less than 1 year of age in a year}}{\text{Number of live births in the same year}} \times 1000$$

7. (Child death rate) 1-4 year Mortality Rate

It is the ratio of deaths of children aged 1-4 year to the total number of children in same age group in a given year expressed as rate per 1000.

$$\text{CMR} = \frac{\text{Number of deaths of children aged 1-4 year during a year}}{\text{Total number of children of the same age at the middle of year}} \times 1000$$

8. Under 5 Mortality Rate

It is the number of deaths of children aged under 5 yrs, per 1000 live births in a given year.

$$= \frac{\text{Number of deaths of children under the age of 5 year in a given year}}{\text{Number of live births in the same year}} \times 1000$$

9. Child Survival Rates

$$\text{CSR} = \frac{1000 - \text{Under 5 mortality rate}}{10}$$

Fertility Indicators

1. Birth rate
2. General fertility rate (GFR)
3. Age specific fertility rate
4. Total fertility rate (TFR)
5. Gross reproduction rate (GRR)
6. Net reproduction rate (NRR)

1. Crude Birth Rate

It is the ratio of the number of live births to the estimated mid year population in a given year, expressed as rate per thousand.

$$CBR = \frac{\text{Number of live births in a given year}}{\text{Estimated mid year population}} \times 1000$$

2. General Fertility Rate (GFR)

It is the ratio of the number of live births in a year to the mid year female group (15-44 or 49yr.) in same year, expressed as rate per 1000.

$$GFR = \frac{\text{Number of live births in an area during the year}}{\text{Mid year female population age 15-44 (49) year in the same area in the same year}} \times 1000$$

3. Age Specific Fertility Rate

It is a precise measure of fertility & defined as "number of live births in a year to 1000 women belonging to specific age group."

4. Total Fertility Rate (TFR)

"Average number of children a woman would have if she were to pass through her reproductive year bearing children at the same rates as the women now in each age group".

5. Gross Reproduction Rate (GRR)

Average number of girls that would be born to a woman, if she experiences the current fertility pattern through out her reproductive span (15-44 or 49 year) assuming no mortality.

6. Net Reproduction Rate (NRR)

Number of daughters a new born girl will bear during her life time assuming fixed age specific fertility & mortality rates.

Measurement of morbidity

Morbidity is defined as "any deviation, subjective or objective, from a state of physical or mental well being due to disease or accident".

Units of measure.

1. Persons who are ill

2. The illnesses (periods or spells of illness) that these persons experienced.

3. The duration of (days, weeks etc) of these illness.

Uses of Morbidity Data

1. They give a picture of the extent, nature of disease burdon in the community & help to decide of priorities.

2. They give comprehensive, accurate & clinically needed information on patient characteristics, that are required for basic research.

3. They are the basis for etiological studies & play vital role in prevention.

4. They are required for monitoring & evaluation of disease control programmes.

Incidence

Incidence rate is defined as "Ratio of the number of new cases occurring in a defined population, during a specified period of time to the population at risk in the same period, expressed as rate per 1000.

$$\text{Incidence Rate (Persons)} = \frac{\text{Number of new cases of specific disease during a given time period}}{\text{Population at risk during that period}} \times 1000$$

Incidence Rate (Spells)

$$= \frac{\text{Number of new spells of illness occuring during a defined period}}{\text{Population exposed to risk during that period}} \times 1000$$

Specific Incidence Rates

1. Attack rate
2. Secondary attack rate
3. Cumulative incidence rate.

1. Attack Rate

$$= \frac{\text{Numbers of new cases of a specified disease during specified time interval}}{\text{Total population at risk during the same interval}} \times 100$$

2. Secondary Attack Rate

$$= \frac{\text{Number of exposed persons developing the disease with in the range of incubation period.}}{\text{Total number of exposed or susceptibles}} \times 100$$

3. Cumulative Incidence Rate

$$= \frac{\text{Number of people who get disease during a specified period}}{\text{Number of people free of disease in the population at risk at the beginning of the period}} \times 100$$

Uses

1. To control the disease

2. For research of aetiology, pathogenesis, distribution of disease & efficacy of preventive & therapeutic measure.

Prevalence

Prevalence is the total number of cases (both old and new) existing at a given point of time or over a period of time in a given population.

"Total number of all individuals with certain characteristics or disease at a particular time (or during a interval) divided by population at risk having the characteristics or disease at this point in time or midway through the period.

1. Point prevalence 2. Period prevalence

Point prevalence

Total number of cases (old & new) of a disease at one point in time in relation to a defined population. Usually point is a day, several days or few weeks.

$$= \frac{\text{Total number of cases (old \& new) of a particular disease at a given point of time}}{\text{Estimated population at same point of time}} \times 100$$

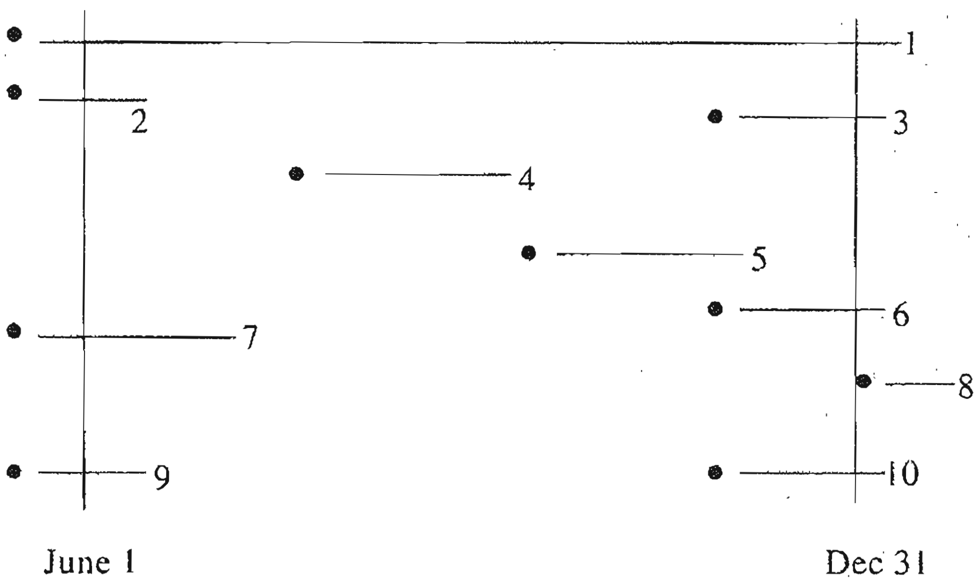
Term prevalence rate means point prevalence

Period prevalence

It measures frequency of total number of cases (old & new) existing during specified period of time (Ex: annual prevalence) expressed in relation to a specific population.

It includes the cases diagnosed earlier & extending into or through to the year as well as those cases arising during the year.

$$= \frac{\text{Total number of existing cases (Old \& new) of a specific disease during a given period of time interval}}{\text{Estimated mid interval population at risk}} \times 100$$



Incidence between	June 1 – Dec 31	–	3, 4, 5, 6, 10
Point prevalence	June 1	–	1, 2, 7, 9
Point prevalence	Dec 31	–	1, 3, 6, 10
Period prevalence	Jun 1 – Dec 31	=	1, 2, 3, 4, 5, 6, 7, 9, 10

Relationship between prevalence & Incidence

$P = I \times D$

$= \text{Incidence} \times \text{mean duration}$

Actual attestation of Death

Death certificate is the basis of mortality data, cause of the death is used for many purposes. The death certificate recommended by WHO for international use is given below.

Cause of Death		*Approximate interval between onset & death*
I.		
Disease or condition directly leading to death.	(a) Pneumonia due to or as consequence of	
Antecedent causes morbid conditions, if any giving rise to above cause stating the underlying condition last.	(b) .... due to or as a consequence of (c)	
II.		
Other significant conditions contributing to the death but not related to the disease or condition causing it.	Hypertension	
This does not mean the mode of dying eg. heart failure, asthma It means disease, injury or complication which caused death.		

International form of Death Certificate

(Modified from K. Park)

The death certificate also contains details of deceased like name, address, age, religion, occupation, date of death. It should also have the stamp of medical practitioner or name of institute, serial number of institution & date of notification, along with signature of medical officer.

●

APPENDIX- I

Statewise Number of Registered Āyurveda Practitioners as on 1.4.2005 (as per available information)

S.N.	*States/UTs*	*IQ*	*NIQ*	*Total*
1.	*Andhra Pradesh*	5811	942015231	
2.	*Arunanchal Pradesh*	0	0	0
3.	*Assam*	250		250
4.	*Bihar*	131121		131121
5.	*Chhatisgarh*	391		391
6.	*Delhi*	2264		2264
7.	*Gujarat*	14438	3591	18029
8.	*Haryana*	5774	13855	19629
9.	*Himachal Pradesh*	2607	4504	7111
10.	*Jammu & Kashmir*	343		343
11.	*Karnataka**	9256	5572	14828
12.	*Kerala*	8230	6715	14945
13.	*Madhya Pradesh*	46300	1302	47602
14.	*Maharashtra*	37695	14677	52372
15.	*Orissa*	3269	1179	4448
16.	*Punjab**	5998	14381	20379
17.	*Rajasthan*	19738	4006	23744
18.	*Tamil Nadu*	1588	1954	3542
19.	*Uttar Pradesh*	42407	17162	59569
20.	*West Bengal**	1753	1170	2923
21.	*Chandigarh**			
	Total	**339233**	**99488**	**438721**

* The figures against these States are provisional.

Statewise Āyurveda Hospitals and Bed Strength

S.N.	*States/Uts/Others*	*No of Hospitals*	*Bed Strength*
1.	*Andhra Pradesh*	8	484
2	*Arunachal Pradesh*	1	10
3	*Assam*	1	100
4	*Bihar*	11	1090

S.N.	States/Uts/Others	No of Hospitals	Bed Strength
5	Chhatisgarh	8	420
6	Delhi	10	643
7	Goa	1	40
8	Gujarat	48	1850
9	Haryana	8	835
10	Himachal Pradesh	24	420
11	Jammu & Kashmir	2	100
12	Jharkhand	1	160
13	Karnataka	122	8147
14	Kerala	120	3432
15	Madhya Pradesh	32	1345
16	Maharashtra	51	7673
17	Orissa	8	488
18	Punjab	15	1181
19	Rajasthan	84	834
20	Sikkim	1	10
21	Tamil Nadu	7	630
22	Tripura	1	10
23	Uttar Pradesh	151	3727
24	Uttaranchal	7	319
25	West Bengal	5	509
26	Chandigarh	1	120
27	C.G.H.S.	1	25
28	Research Councils	24	600
	Total	**753**	**35182**

Statewise Āyurveda Dispensaries as on 1.4.2005

S.N.	States/Uts/Others	Ayurveda
(1)	(2)	(3)
1	Andhra Pradesh	620
2	Arunachal Pradesh	2
3	Assam	268
4	Bihar	311

S.N.	*States/Uts/Others*	*Ayurveda*
5	*Chattisgarh*	632
6	*Delhi*	148
7	*Goa*	11
8	*Gujarat*	490
9	*Haryana*	460
10	*Himachal Pradesh*	1118
11	*Jammu & Kashmir*	253
12	*Jharkhand*	122
13	*Karnataka*	589
14	*Kerala*	730
15	*Madhya Pradesh*	1427
16	*Maharashtra*	490
17	*Manipur*	0
18	*Meghalaya*	2
19	*Mizoram*	0
20	*Nagaland*	-
21	*Orissa*	624
22	*Punjab*	507
23	*Rajasthan*	3482
24	*Sikkim*	
25	*Tamil Nadu*	24
26	*Tripura*	40
27	*Uttar Pradesh*	1821
28	*Uttranchal*	467
29	*West Bengal*	298
30	*A & N Islands*	1
31	*Chandigarh*	6
32	*D & N Haveli*	1
33	*Daman & Diu*	1
34	*Lakshadweep*	2
35	*Pondicherry*	15
36	*C.G.H.S*	31
37	*Research Councils*	6
38	*M/o Railways*	39
39	*M/o Labour*	127
40	*M/o Coal*	28
	Total	**15193**

Statewise Licensed Āyurveda Pharmacies As 1.4.2005

S.N.	*States/Uts*	*Ayurveda*
(1)	(2)	(3)
1	*Andhra Pradesh*	558
2	*Arunachal Pradesh*	
3	*Assam*	40
4	*Bihar*	216
5	*Chhatisgarh*	53
6	*Delhi*	57
7	*Goa*	8
8	*Gujarat*	294
9	*Haryana*	450
10	*Himachal Pradesh*	70
11	*Jammu & Kashmir*	9
12	*Jharkhand*	0
13	*Karnataka*	135
14	*Kerala*	1134
15	*Madhya Pradesh*	625
16	*Maharashtra*	677
17	*Manipur*	0
18	*Meghalaya*	1
19	*Mizoram*	0
20	*Nagaland*	0
21	*Orissa*	192
22	*Punjab*	149
23	*Rajasthan*	391
24	*Sikkim*	2
25	*Tamil Nadu*	404
26	*Tripura*	0
27	*Uttar Pradesh*	2062
28	*Uttaranchal*	77
29	*West Bengal*	324
30	*A & N Island*	0
31	*Chandigarh*	3
32	*D & N Haveli*	19
33	*Daman & Diu*	17
34	*Lakshadweep*	0
35	*Pondicherry*	30
	Total	**7997**

BIBLIOGRAPHY

Aṣṭāṅga Saṁgraha by Ravidutta Tripathi- Chaukhambha Sanskrit pratisthana.

Aṣṭāṅga Hṛdaya sarvāṅgasundara & Āyurveda rasāyana tika- Chaukhambha Orientalia, Varanasi.

Āyurvedīya Pañca Karma Vijñāna by Haridasa Kasture- Baidyanath publication.

Āyurvedīya Prasūti Tantra evam strī roga by Dr. P.V. Tiwari- Chaukhambha Orientalia, Varanasi.

A Hand book on Preventive and Social Medicine by Yash pal Bedi- Anand publishing co.

A manual of science and philosophy of Yoga by Prof. K.N. Udupa- Sarvodaya Sahitya Prakashan.

Āsana Prāṇāyāma Mudra Bandha by Swami Satyananda Saraswati- Bihar Yoga Bharati.

Bhāva prakāś Vidyotini tīka- Chaukhambha Sanskrit Sansthan.

Caraka Saṁhitā Cakrapāṇi tīka- Chaukhambha Orientalia, Varanasi.

Caraka Saṁhita by Bhagawan Dash II edition Chaukhambha Sanskrit S. Office.

Dravyaguṇa vijñāna by Acarya priyavrat Sarma.

Drug and alcohol abuse by Marc A Sihisckit.

Gheraṇḍa Saṁhitā by Raghavendra sarma- Chaukhambha Sanskrit pratisthana.

Hand book of Nature cure

Hand Book of clinical oncology by James Abraham, Carmen J. allegro-lippincott,Williums & Wilkins publication.

Haṭha Yoga pradīpikā by Swatmaram Khemaraja srikrishnadas publication, Mumbai.

History of Indian medicine by Acarya P. V. Sarma.

Hydrotherapy by Leun and Charson.

Light on Yoga by B.K. S. Iyengar- Harper collens publication.

Methods in Biostatistics by B.K. Mahajan- Jaypee publishers.

Muhurta Martāṇḍa by pt. sri Kapileshwar sastri, Chaukhambha Sanskrit Sansthana.

Nature cure by K. Lakshman sharma.

Pātañjala Yoga Pradīpa by Sri Omananda tirtha- Geetha press.

Sānkrāmika roga Vijñāna by Kaviraja Rama shukla- Sri Baidyanath publication.

Saṅgadhara Saṁhitā subodhini Vyākhya- Chaukhambha Sanskrit series.

Sarira kriya vijñāna by Ranjit Roy desai.

Speaking of Nature cure by K. Lakshman sarma.

Susruta Saṁhitā Ḍalhana ṭīka- Chaukhambha Orientalia, Varanasi.

Susruta saṁhitā by Kaviraja Ambika Dutta Shastri- Chaukhambha Sanskrit Sansthan.

Svasthavṛtta Samuccaya by Vaidya Rajeshwar dutta Sastri.

Svasthavṛtta Vijñāna by Dr. Ramaharsh singh Chaukhambha Sanskrit pratisthana.

Text book of Preventive Medicine (8th edition) by K. Park.

Text book of preventive and Social medicine by M.C.Gupta & B.K. Mahajan- Jaypee publishers.

Text book of Physiology by Arthur Guyton- W.B. Saunders.

Text book of Medicine by Davidson.

Yajñāvalkya Smṛti by Umeshchandra pandey- Chaukhambha.